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The JOURNAL of

COMMUNICATION

SYMPOSIUM ON FOUNDATIONS OF COMMUNICATION THEORY

Dr. Bess Sondel, *Symposium Editor*

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Editorial:

IN RETROSPECT

Universal approval is a goal that no sane editor would possibly seek; and though sensitivity to both favorable and unfavorable comments is almost an occupational malady, these criticisms represent such a small fragment of the readership that an editor eventually concludes that he must rely upon his own private criteria and that he ought to limit his public statement of stewardship to factual reporting—if such is possible.

Having boldly pronounced the primacy of objectivity, the Editor quickly asks permission to deviate temporarily from such a high sounding goal. Calling fully upon subjectivity, he reports that he found his editorship both pleasant and instructional, that he learned much even from manuscripts which he rejected, that he came to realize that unpleasant decisions are an inherent part of the total duty, that he is grateful to the NSSC for giving him the opportunity to serve, and that he is deeply appreciative of the cooperativeness of authors, departmental and associate editors, NSSC officers, and the staff of the Allen Press, our printer.

Looking backward, he takes a certain amount of pride in what he regards as achievements: (1) *The Journal*, more through the work of the Executive Secretary than through that of the Editor, has been expanded from forty-eight to sixty-four pages (if present

(Continued on page 240.)

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THE JOURNAL OF COMMUNICATION

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FOUNDATIONS OF COMMUNICATION THEORY— A FOREWORD

WAYNE N. THOMPSON

Every serious student of communication realizes that he is concerned with a field that transcends the usual academic departmental lines, but an understanding of the depth of the levels of interrelationship is rare. Perhaps the greatest value of the following symposium, which Dr. Bess Sondel has assembled and edited, lies in the fact that it indicates clearly that the contributions of diverse disciplines to communication theory are both complex and fundamental.

Few learned magazines have ever had the privilege of bringing to their readers such a distinguished group of contributors as those whom Dr. Sondel has assembled from two continents. She deserves the gratitude of the entire membership of the NSSC.

Prof. D. M. MacKay, of England, is a distinguished physicist who has directed his attention largely to problems of communication and who has brought to this field an approach both disciplined and creative. Prof. Edmund W. Sinnott, an eminent biologist and the Dean Emeritus of the Graduate School, Yale University, is a scholar who sees important parallels between biological processes and communication as semantically perceived. Prof. Gardner Murphy, who now is Director of Research for the Menninger Foundation, is one of America's outstanding authorities in psychology and personality theory. Prof. F. S. C. Northrop, the Sterling Professor of Philosophy and Law at Yale, is the author of two recent books in the general areas of ethics and politics. Prof. Charles Morris, formerly of the University of Chicago and now at the University of Florida, also a philosopher, represents semiotics, the science of signs, in the symposium. He, like the other contributors, is the author of many major scholarly works in his own field.

The authors, of course, speak for themselves in the pages which follow, but the temptation to comment upon their articles individually and collectively is strong.

Professor MacKay begins the symposium with an article which succeeds in locating the principle from which two seemingly unrelated uses of the word *information* arise. Whether viewed by an engineer or by a linguist, information is "that which deter-

mines the form of some activity or state of affairs." The impact of information affects the receiver in some choice or decision, and the amount of information which a communicative unit contains depends upon the extent to which the receiver is affected. Determining the degree of impact, of course, is difficult, but Professor MacKay contributes an analysis which serves to define the problem more specifically than it has been previously. Distinguishing between the present status of the receiving organism and the goal-state to which it aspires, he analyzes information in respect to the degree to which the receiver moves from the *status quo* toward the desired situation. The organism has a readiness to respond, and information determines the form of activity which occurs or the state of affairs which follows. Thus the communicative item has the effect of selecting among the possible forms of activity.[1]

Both the engineer and the linguist, therefore, are concerned with the response of the receiving organism. The contribution of the former may lie in the fact that his precise mathematical approaches to the impact of communicative "bits" may provide clues to the fundamental nature of communication. Such discoveries, like others in basic science, may lead the way to applications in those communicative activities which ordinary man practices and can observe.

The underlying lawfulness of communication is confirmed by Edmund W. Sinnott in "The Biological Basis of Communication." He points out that "a norm" regulates the growth and the development of every organism. Like machines which are self-regulatory through feedback mechanisms, organisms, both developmentally and in activities at the instinct level, pursue tenaciously the course which their "norm" dictates. Norms, likewise, regulate the activities of creatures which think, but here the process is more complex. Purposive activities are directed so that the organism gains those objectives which it values. In all types of organisms, both the simple and the complex, the regulatory norms possess two essential characteristics: (1) they change as the organism

[1] Professor MacKay in a letter to Dr. Sondel relates these ideas to perception: "Perception becomes the updating of the state of readiness of an organism to respond adaptively (with respect to what is 'perceived'). And relevance is measured by the degree to which incoming information updates the state of readiness for the activity."

evolves; and (2) they are organized, patterned wholes with the several norms (or values) interrelated. All mental activity has a biological basis; and since communication is a correlate of mental functioning, an understanding of the regulatory mechanisms which govern biological activity is helpful in grasping the fundamentals of the communication process. The basis of motivation is value seeking, and the pattern of words is a means by which one person relates ideas to the norms which govern the behavior of another. Education, Professor Sinnott points out in conclusion, is possible only through the use of word patterns in communication.

Professor Gardner Murphy in "Toward a Field Theory of Communication" begins by distinguishing between the Spinoza principle that reality has many aspects and his own analysis of *cross-organization* as linkages between two systems which consist of different kinds of phenomena. In other words, there is a difference between a situation in which *different* phenomena are brought into the same conceptual scheme and that in which the *same* things take on unlike appearances. He proceeds to examine the doctrine of isomorphism with respect to communication, to analyze personality in respect to three levels of complexity, and to discuss transaction. He concludes the article by expressing the opinion that many areas of identity exist between verbal patterns and the patterns of the nervous system. Although much is unknown about neural organization, it is certain that communication occurs *within* the individual.

In the article by Professor F. S. C. Northrop the symposium turns to philosophy and ethics as contributors to a vital dimension of the total study of communication. Whereas the physicist, the biologist, and the psychologist were concerned with the nature of the communication process and with methods of extending our knowledge, the philosopher is interested primarily in the moral implications of the way communication as an instrument is used. The world, Northrop observes, consists of leaders who are senders and of followers who are receivers. This point is not new, but two modern technological developments and an accompanying, though not inevitable, attitude create startling and disturbing moral issues. Because both mechanical brains and access to the mass media of communication are so expensive that

only the rich and the powerful can utilize them, the few now have a degree of advantage over the many far beyond that which formerly existed. Simultaneously, the attitude has developed that the masses are to be regarded as blobs of humanity on the receiving end of a stimulus-response linkage. The time has come, says Northrop, for man to arise in protest against communication engineering and to insist that he be treated as "a freely assenting moral, legal, political, and religious human being." Whether these problems are really new or are old ones now accentuated is not mentioned in the article, but the view that a digital computer creates (or heightens) a moral problem will be of interest to many readers.

Also a philosopher, Charles Morris in the final paper in the symposium examines one aspect of the thought processes—the dynamic relationship between evaluation and science. Human beings, he begins, have a number of values which govern their choices; and although all values at one time or another are subject to self-examination, in each given situation there is one which serves as the criterion by which the decision is made. Knowledge is a factor in evaluation, and "the more scientific it is the better." Quality of thought indeed is a basic aspect of communication—of what value is it to have near perfection in encoding, transmission, and decoding if the message itself is faulty? Morris by explicating the dynamic interrelations of values and knowledge (the "is" and the "ought," to use one of his expressions) contributes in an important and provocative way to the whole topic of message formation.

The papers collectively, though merely sampling the many divergent viewpoints which can illuminate communication, serve the purpose of showing the extensiveness of the resources for anyone who contemplates a life of scholarship within the field of communication theory. Both abundant and rich, these resources exist at all levels of difficulty from the obvious to the obscure. Francis Bacon observed that "Some books are to be tasted, others to be swallowed, and some few to be chewed and digested." The papers which Dr. Sondel has collected belong to the third of Bacon's categories. The Editor suspects that each time the reader re-examines these contributions he will find new points of departure for his own thoughts.

OPERATIONAL ASPECTS OF SOME FUNDAMENTAL CONCEPTS OF HUMAN COMMUNICATION

D. M. MacKay*

In everyday language we are accustomed to speak of the meaning and the relevance of information. In the statistical theory of communication,[1] on the other hand, no such concepts appear. Indeed, its founders have very properly insisted that the "amount of information" (or better, the selective-information-content) of a signal, as they define it, bears no direct relation to the semantic function of the signal.

From its inception, naturally, the statistical theory of communication has been plagued by questions of the relationship of its concepts to those normally associated with the term *information*. Where do concepts like meaning fit into the picture? Or is it that the concept of information which the communication engineer has in mind is a quite different one from the concept of the semanticists?

The trouble here appears to be largely because of a confusion of the concept of information with that of information-content—the confusion of a thing with a measure of a thing. Communication engineers have not developed a concept of information at all. They have developed a theory dealing explicitly with only one particular feature or aspect of messages "carrying" information—the amount of their (mathematical) unexpectedness, measured by the average logarithm of their improbability.

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* Dr. MacKay, formerly with the Wheatstone Physics Laboratory, Kings College, University of London, now is Professor of Communication, University College, Keele, Staffordshire, England.

This article is a much abbreviated version of a paper of the same title in *Syntheses*, IX (1954), 182–198. MacKay's later discussions of this and related topics include the following:

"The Place of 'Meaning' in the Theory of Information," in E. C. Cherry (ed.), *Information Theory* (London: Butterworths, 1956), 215–225.

"Complementary Descriptions," *Mind*, LXVI (1957), 390–394.

"Complementarity II," *Proceedings of the Aristotelian Society, Supplementary Volume*, XXXII (1958), 105–122.

"What Makes a Question?" *The Listener*, LXI (May 5, 1960), 789–790.

"The Informational Analysis of Questions and Commands," in E. C. Cherry (ed.), *Proceedings of the 4th Symposium on Information Theory*. In press.

[1] Referred to by some as Information Theory, but not by Shannon, its chief originator. Information Theory logically embraces a much wider field. See C. E. Shannon, "Theory of Communication," *Bell System Technical Journal*, XXVII (1948), 379 and 623.

Information a Generic Term

Now, although semanticists on the other hand are concerned with other features of information, such as its logical complexity and its meaning, I wish to maintain that both semanticists and communication engineers have in mind the same concept of information. Both mean by "information" that which determines the *form* of some activity or state of affairs. Both are entitled to regard this function of information as selective: as prescribing choice or decision. The engineer defines a suitable measure of the unexpectedness or *infrequency* of the choice, and calls his measure the selective-information-content. The semanticist may seek to define suitable measures of the *logical complexity* of the form determined, and is also entitled to call these "measures of information-content," in various complementary senses.

Two Complementary Languages

Our first precaution must be to distinguish clearly between two complementary languages in which we may describe an activity like gaining information. There is, first, the private agent-language in which I, as agent, describe what I know; secondly, there is the public observer-language in which we might hope that a super-mechanic of the brain could describe what goes on in the human organism as the correlate of my account.

There seems no good reason to miss any clues we can gain from the use of words from both languages, provided we are clear at all times which we are using and provided we avoid the common pitfalls of careless mixing of the two. We shall be wise not to presume the existence of any simple one-to-one correspondence, but to treat what correspondence we find as permissive rather than confirmatory.

By seeking an objective description in "observer-language" of what goes on in the world of people and things when a man receives information, I believe it should be possible to form one coherent picture of the whole process of communication, in which concepts like selective-information-content and concepts like meaning would both find a place and be seen in their proper relationship.

Subjective Agent-Language

Let us begin in subjective agent-language. I normally say I have gained information when I know something now that I didn't know before: when what I know has changed.

How much more information do I gain from one statement, or experiment, than from another? I might be able to answer this question quantitatively if I could measure the corresponding changes in what I know. I get more information from that which makes a bigger change in what I know.

How could we hope to measure—or even define quantitatively—changes in what I know? Could we perhaps count the minimum number of independent simple sentences in which the change could be described? Scientific language is one of the few lending themselves readily[2] to such discipline. But scientific language is too easily quantified to be typical, and normal human language is notoriously different from the ideal of the scientist or the logician. Am I sure, moreover, that I can always fully describe all changes in my state of knowledge in sentences, or indeed in any objective symbolization? Is what I know limited to what I can describe?

The Link with Objective Observer-Language

Let us now ask in more general operational terms what difference it makes when I gain information. Fundamentally it implies that in some circumstance or other my *expectations* will be different. I am now ready to react differently. The reactions potentially affected may be internal or external. They may themselves take the form of choices from among a number of "conditional" states of readiness to react, and it is the hierarchy of such readinesses—my total state of readiness for adaptive or goal-directed activity—that changes when I gain information. (Information could, in fact, be defined in agent-language as that which alters my total state of adaptive readiness in this sense.)

It would seem that the closest correlate of my state of readiness in observer-language is thus a specification of a stochastic (rather

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[2] D. M. MacKay, "Quantal Aspects of Scientific Information," *Philosophical Magazine*, XLI (1950), 289. Another paper with the same title is in the *London Symposium on Information Theory, 1950*, pp. 50–80. (Reprinted by American I.R.E., 1952.)

than a deterministic) process. Not that a catalogue of probabilities and conditional probabilities is what I *mean* by my state of readiness. But the latter in theory would presumably express itself through the statistical structure of my total adaptive reaction-pattern.

Remembering that the total reaction-pattern includes internal as well as external activity, we shall take as the objective correlate of my subjective state of readiness the matrix of conditional-probabilities, or conditional-probability-matrix (c.p.m.) describing statistically the total adaptive reaction-pattern to all possible configurations of stimuli, internal and external. Our suggestion is that by discussing the effects of information on the c.p.m. we can find an operational rôle for all the concepts clustering round the notion of information in both communication theory and semantics—at least for their correlates in observer-language, which is perhaps as much as an objective theory can hope to do.

The Internal Representation of the Current "State of Affairs"

The essential notion around which we shall build our concept of perceptual (information receiving) activity is that of adaptive or matching-response.[3] How do we distinguish adaptive response from evoked activity in general?

The basic requirements are two:

1. In the organism there must be one or more evaluatory mechanisms embodying criteria of success or failure: mechanisms, that is, indicating the difference between the present state of the organism and some current equilibrium condition or goal-state;

2. Then (the crucial feature) these indications must alter the controls that govern activity (including the choice of subsidiary goals if necessary) in a way calculated to reduce (at least statistically) the difference between the present state and the goal-state. Evidently the controls can come to rest only if the goal state is attained and the difference-signal reads "zero."[4] Unless this is so, they should always be found actively opposing any changes in the state of affairs which would tend to increase

[3] D. M. MacKay, "Mindlike Behavior in Artefacts," *British Journal for the Philosophy of Science*, II (1951), 105–121.

[4] This formal description applies equally to situations where "error" is *minimized* and to those where a desired output is *maximized*.

the difference-reading. This is, of course, the type of control familiar in engineering under the name of negative feedback. An adaptive or matching-response is one which is goal-directed in this way toward minimizing the degree of mismatch as indicated by evaluatory mechanisms. We might define it as "activity under the correction of evaluatory signals."

The point of special relevance here is that insofar as an adaptive response is successful, the automatic movements of the goal-directed control-centre will in quite a precise sense mirror the current state of affairs, or rather those features of the state of affairs to which it is responding adaptively. The state of the control-centre is, in effect, an internal *representation* of those features of the state of affairs.

Our suggestion is that the current changes in the "setting of the controls" to maintain a satisfactory matching-response (relative to definite though not necessarily permanent criteria) form a representation of the information actually perceived—i.e., what the man is noticing in the flux of events. Perception is the "keeping up to date" of the matching state of readiness.

Hierarchical Control Mechanism

There is not space here to discuss the different ways in which evaluative correction can guide the growth of a hierarchy of control mechanisms, for altering the relative probabilities (or rank-order) of trial of mechanisms for altering the relative probabilities . . . to as many terms as we wish.[5]

It is not difficult to see, however, that any statistical regularities in the flux of demands will tend to find themselves reflected sooner or later in the conditional probabilities of different responses. Such a hierarchical mechanism would in time come to represent a set of *abstractions* from the statistical structure of demands to which the organism has made adaptive responses, representing what past experience has shown to be steady features of its world of activity.[6]

The higher-order probabilities in such a system will tend to change most slowly; the lower-order, most rapidly. Changes in

[5] See the author's later paper in C. E. Shannon and J. McCarthy (eds.), *Automata Studies*. (Princeton, N.J.: Princeton University Press, 1956.)

[6] D. M. MacKay, "Mentality in Machines," *Proceedings of the Aristotelian Society, Supplementary Volume* (1952), 61–86.

the lower which persist in occurring will tend to become reflected in changes at a higher level adapted to evoke the lower changes automatically. Thus gradually only those aspects of situations which are new to the organism will come to evoke adaptive activity at the level of the controlling mechanisms. (In agent-language, familiar items will come to be expected, and will yield a smaller and smaller amount-of-information. They may even cease to be noticed.)

Operational Definition of Information

We can now complete our transition from the subjective discussion of information. Information may be generally defined as that which determines the form of activity or states of affairs. In the human organism, the form determined is that of the hierarchy of readinesses for adaptive response.[7]

This brings us to the problem of defining (at least conceptually) objective correlates for the notions of the meaning and relevance of information.

The meaning of a signal to a given receiver (in observer-language) may be defined as the *selective function* of the signal relative to the range of his possible states of readiness (i.e., of the c.p.m.).[8] The selective-information-content for the receiver, we remember, is a logarithmic measure of the unexpectedness of the corresponding operation. Thus we can readily see why even to the receiver the selective-information-content is not directly related to the meaning. Even if his state of readiness happened already to match the signal, so that the prior probability of adaptive response was unity and the selective-information-content nil, its meaning would, of course, be unaltered.

We may assume that part of the human mechanism of adaptive response governs a variety of internal activities such as humoral secretion and the like, which are not directly coupled to our mechanisms for handling propositions and are only vaguely describable in agent-language, if at all. If this is so, it may serve as a further caution against supposing that the meaning of an

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[7] It should be remembered that only the adaptive c.p.m., and not the c.p.m. for all activity, embodies the representation of the perceived world.

[8] A distinction should be carefully made between this definition of meaning-to-the-receiver and the notions of intended-meaning and generally accepted meaning, whose analogous definitions are obvious.

utterance can be exhausted by a catalogue of its equivalent propositional content. Both the intended meaning and the understood meaning in our sense of the term may have nonpropositional components without necessarily being rendered in the least *indefinite* in consequence. It seems important to free ourselves from the notion that something is indefinite unless someone can talk definitely about it.

So far we have been concerned only with the meaning of a complete message, but the concept of meaning here defined is readily generalized. A single word of a message, for example, does not in general evoke a unique selective operation. It may be thought of as setting up a conditional probability-*distribution* over a range of possible matching-responses, which is gradually moulded and narrowed down as the message is completed. Its meaning may still be defined as its (now incomplete) selective function.

Relevance of Information

Receiving a complete answer to a question determines one out of a subset of possible adaptive responses, which, until then, were undetermined or only partly determined (i.e., statistically). To frame a question is to specify this subset of undetermined responses. It is to invite a selective operation on this subset.

When information is said to have "more relevance" to one question than another, we mean that its selective function relates more to one subset than to the other.

The notion of *relevance* of information to a question can thus be quantified by considering the *proportion* of the total selective operation that concerns the required subset. Once again, an abbreviated statement must here suffice, but it should be clear that in these terms a quantitative theory of relevance suggests itself as naturally as that of meaning.[2]

The Communication Process

By way of summary, we may now review the picture of the communication process that we have been building up.

The object of communication in agent-language is to evoke in the mind of the receiver something that the originator has in mind. We have taken as a correlate of "having in mind" in observer-language the possession of a certain (objectively) spec-

(Continued on page 219.)

THE BIOLOGICAL BASIS OF COMMUNICATION

EDMUND W. SINNOTT*

In today's active study of the nature of man there are two words more widely used, perhaps, than any others. They are *purpose* and *value*. These words antagonize some strict determinists for they may appear to imply finalism, teleology, the influence of the future on the present and other notions incompatible with scientific orthodoxy. To use them may brand one as a mystic, a vitalist or a believer in the "retreat from reason."

And yet value and purpose are very real things, interpret them how we will. Indeed, one of the chief problems that we face today is to establish in men's minds those values that will tend toward his survival and his highest satisfactions and to endow him with the strength of purpose to realize them. The concepts of value and purpose, I believe, can be drawn down out of the clouds of metaphysics and stated in strictly biological terms that possess no mystic overtones and that have important implications for philosophy and education. Briefly, the argument is this:

SPECIFIC PATTERN

In the growth and development of every organism there is a *norm* to which it tends steadily to conform by regulatory action. This is based on a specific genetic constitution that responds in a specific way to a specific environment. If normal development is disturbed, the organism will tend to restore it by regeneration of lost parts, reorganization of its material, modification of its physiological activities or in other ways. In the living stuff of the fertilized egg, and probably in every cell of the individual, there is something that represents the steps of the normal developmental process and the mature organism that will result. In some way, still far from understood, the mature individual may be said to be immanent in the egg from which it grows. Such a norm is presumably a specific pattern of some sort in living stuff. The essential fact is that in conformity *to* this norm the life of the organism tends always to be regulated.

Instinctive patterns of behavior show similar normative action. What the organism does—the spinning of a web, the capture of prey, the collection of nectar, the course of migration—follows a definite inborn pattern. If circumstances change, the animal

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shows a remarkable versatility in regulating its behavior to the new conditions. The *end* is the same, though the ways of reaching this may be various. There is in the nervous system a behavioral norm to which the animal regulates its activities. This norm may be regarded as essentially a teleological phenomenon, a primitive purpose, like that which guides the growth of the organism. Not until the brain becomes large enough to allow for the beginnings of consciousness—not simply awareness but a certain degree of introspection—does this become conscious purpose. Conscious purpose is the *subjective experience* of the operation of this regulatory activity in the brain. A purpose may be compared to the norm of a self-regulating machine, and presumably is effective through a feed-back mechanism of some sort. There should be no objection to this concept of purposive activity, which may be interpreted as mechanistically as one wishes.

Purpose and Value: Two Aspects of Biological Regulation to Norms

The way the behavioral norm is established is the real problem. Both in development and in instinct the norm is under direct genetic control. It will differ under different environmental conditions, but its range is usually slight. With the development of man's complex nervous system, however, a far wider variety of purposes appears. Possible choices are vastly increased because of the much greater sensitivity to outer or inner stimuli and the much wider range of environmental factors. Conscious life thus consists of a series of successive norms to which behavior conforms—a series of goal-seekings, of purposes. Many of these are temporary and short-lived, like those governing the strokes in a tennis match. Others are longer lasting, like the purpose to amass a fortune. Purposes are the simplest of psychical activities, and from them in turn, I think, come all other mental phenomena, culminating in abstract thought. All manifestations of mind are at bottom regulatory to norms set up in the brain. Just as the adult organism may be said to be immanent in the fertilized egg, so a purpose, yet to be realized, may be said to be immanent in the cells of the brain.

A significant quality of any purposive activity, physical or mental, is that it is always directed *toward* something, its *value*.

Organisms are not neutral things. They show preferences for particular values. An amoeba, moving toward a source of food, is making a primitive value judgment. Among lower animals values are very simple—food, safety, sexual satisfaction, and a few others. In man there are added to these an almost endless series of higher values—power, wealth, excellence, beauty, and satisfactions of many kinds. In some cases the individual performs a series of purposeful physical acts to gain these values. A hungry animal seeks food; a sculptor uses his chisel to make a work of art. In many instances, however, the value is not thus actively sought by bodily means but remains in the mind as a desire, an ambition, an ideal, an aspiration. These are mental, not physical, acts. They ultimately may lead to action, but their importance is that they establish the direction in which the life of the individual will move. His values are the things he *wants* and this is the most important fact about him.

Purpose and value thus are two aspects of biological regulation to norms, developmental or behavioral. The individual seems to be *drawn toward* something, not driven to it, as prevailing psychological theory maintains. What the physiological basis of this activity may be is not understood, but presumably it is much the same as that underlying homeostasis—a feed-back mechanism of some sort. Teleology becomes scientifically respectable.

This general conception, which perhaps may be called *telism*[1] has bearing on the theories of learning and communication, and it is this that the present paper endeavors to develop. But, first, we must consider two significant aspects of the biological norm—the process of change and the concept of wholeness.

The Biological Norm—Change and Wholeness

The biological norm is continually changing, not only with the development of the individual but in response to alterations in the environment. This is much more than homeostasis, which merely maintains the *status quo*. In every living thing there is a progressive change from fertilized egg to old age; and, on a vastly longer time scale, from the simple, ancient forms of life

[1] The author has developed this idea much more fully in several books: *Cell and Psyche* (Chapel Hill: University of North Carolina Press, 1950); *The Biology of the Spirit* (New York: Viking Press, 1955); and *Matter, Mind and Man* (New York: Harper & Brothers, 1957).

to those of today. Organic evolution is this process of change. Life, unlike lifeless mechanisms, is *creative*. This creativity consists in the establishment of new norms to be attained. Much attention is being paid today to the creative process, and I think we should recognize that this is not the production of mere novelty but of new goals, values, ideas, patterns, to the attainment of which the activities of life are directed. Education is the continual acquirement of new and higher goals.

Another quality of a biological norm is its *organization*. A norm is not a formless thing but a patterned whole. A living plant or animal is an *organism*, in which each part and activity is correlated with all the others. Each has an influence, as it develops, on all the rest. A norm is the expression of this organized, interrelated system. When a portion of the body is removed, regeneration tends to restore just enough to complete an organized whole. This concept of *wholeness* is what Smuts has emphasized so well in his book *Holism and Evolution*. The form, structure, and pattern seen in the bodies of living things are the simplest and most obvious expressions of this organized wholeness.

A behavioral norm also is organized. A series of instinctive acts are not carried out at random but are related to each other in a pattern of behavior. If the suggestion here offered is correct, the mind is a succession of norms to which behavior conforms. That these are truly patterned is shown most simply by the fact that they so often tend to produce or to perceive patterns or *Gestalten*. Something in the brain organizes a host of diverse sensory stimuli into specific patterns. This fact is the basis of Gestalt psychology. A thought or an idea may thus be regarded not merely as a simple thing by itself but as part of an organized whole, related to what has gone before and what is coming after. This thought is *true* if its pattern corresponds to something in the actual world and *false* if it does not do so. The patterned thought of a man of science may lead to the discovery of a hitherto unknown relationship in nature. The hallucinations of a drug addict lead only to confusion. The mind is a much more complex affair than a mere "stream of consciousness."

Relevance to Teaching and Learning

This conception has some bearing on the processes of teaching and learning, which are, in turn, based on techniques of com-

munication. The primary aim of teaching, it seems to me, is to set up in the mind of the learner a new thought pattern that is true, that corresponds to reality.

Learning may be achieved by using the long, hard road of individual experience, by trial and error. A person might go through all the steps by which discoverers in the past have found the truth. He could learn that the square of the hypotenuse of a right triangle equals the sum of the squares of the other two sides, or that a floating body displaces its own weight of water, or that sugar is made in a green plant by the union of carbon dioxide and water. A thousand lifetimes would evidently be too short for this, and the purpose of education is to harvest the manifold experiences of the past and to transmit them directly to the next generation.

Such transmission requires a method of communication between teacher and learner. This may be accomplished merely by observation and imitation. One may learn to lay brick by watching a skilled craftsman do it, but in most cases a far more rapid and efficient method of teaching is by the use of language in communication. Without language, education in any large sense could not take place. Language makes civilization possible.

Communication, a Morphogenetic Process

What is it, we may ask, that language does? It accomplishes more than transmitting a series of signals or symbols. It communicates ideas. The teacher endeavors by words to set up in the mind of the learner a particular pattern of thought, a purpose to achieve, a mental structure or norm that corresponds with reality. As Dr. Sondel has said, "It is man's forever unfinished task to make verbal patterns whose relational structure can be put into a one-to-one correspondence with actual patterns in the world of people and things, and, indeed, in the universe."[2] Teaching therefore may be said to be a morphogenetic process, basically not unlike what happens in the control of organic development, *but producing its effect by communicating a pattern of words instead of a pattern of genes.* This, I believe, is more than an argument from analogy, for it emphasizes the fundamental biological basis of all mental activity.

[2] Bess Sondel, "Communication in the Teaching-Learning Experience," *The Journal of Communication*, IX (December, 1959), 153.

There is another important implication of this idea for education. Education is too often regarded as merely filling the mind of the student with factual knowledge. This is important, to be sure, but I think that even more so is its role in stimulating the student to *want* to know. A man's character is the sum of what he really wants, of his basic values, of the things toward which he is drawn. The long experience of our race has shown that the pursuit of some values leads to more permanent satisfactions and a more successful social order than does the pursuit of others. Today, for example, it is vitally important to decide whether wealth, security, and a high standard of living are as worthy goals as freedom and self-reliance. So to interest a student in the acquisition of knowledge that he will continue to pursue it for himself is a great aim of education, but to induce him to seek beauty, goodness, and truth as his highest values is a still greater one. Motivation, that capital-letter word in modern pedagogy, can be better understood and controlled if we recognize its biological basis as one of value-seeking and purpose rather than as the result of an inner driving force. These high values may be communicated to the student by words, by example, or by the subtle influence of one personality on another. How to accomplish this is the high art of teaching.

Summary

In all living stuff there is a series of norms to which all its activities—developmental or behavioral—tend to be regulated.

Conscious purpose is the subjective experience of regulatory action in the organism, notably in the nervous system and the brain, and purpose is *directed toward* the values that are sought. Behavior is thus always concerned with the future. In development and in evolution, norms are continually changing. Creativity is the process by which new norms are set up in biological systems.

Purpose is implicit in protoplasm. Values are patterns of wants. They provide the stuff and the operational means of development and of behavior.

The process of education should be the means, through the use of word patterns in communication, of integrating successfully the complex, future-directed processes of life to serve our highest values.

TOWARD A FIELD THEORY OF COMMUNICATION

GARDNER MURPHY*

There are many kinds of organization at work in the living body. There is the organization of the central nervous system; the organization of the biochemical, including the endocrine system; and other physiological components suggest themselves. We may also think of the organization of the symbolic system in terms of the habits of understanding and uttering speech, with the related habits connected with reading and writing. These, in turn, are related to the language of gesture, stance, posture, facial expression, etc. If, as we suppose, all of these have their physiological basis, these are subsystems somewhat articulated with one another, but all rooted to some degree in physiological function.

The subsystems are, if you like, colonies of the empire-building family which is the total process of adjustment to life. These various colonies have terms of reference to one another and also to the mother country. From this point of view it would not be reasonable to ask whether the neural system and the symbolic system are dependent or independent. On the contrary, the body has its own organization and the symbolic system has its own organization, but there are no points in the one which are entirely unrelated to points in the other. Rather, as one inspects the central nervous system or the endocrine system, one finds that contributions to any given symbolic activity, whether expressing understanding or overt communication, are bound together with all the other centers which control physiological activity.

We are constantly conceptualizing—that is, slicing the melon, separating out certain things for clear observation, and ignoring other things. From this point of view the relation of an uttered word to its brain center may not at the moment interest us, but it is there all the same. The engrams, or traces, of former communicative activity are presumably laid down in the nervous

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* Dr. Murphy is Director of Research for the Menninger Foundation. This paper, which is the culmination of extensive correspondence between Dr. Bess Sondel and the author, contains a number of references to earlier letters.

system more or less flexibly, but nevertheless functionally. When two phenomena, such as a neural phenomenon and a verbal phenomenon, are simply different aspects of the same basic reality, there are certain ways in which the same central verbal activity is represented to our conceptualizing role as scientists. This is an example of Spinoza's principle that reality has many aspects.

But the Spinoza principle is *not* a matter of *cross-organization* as used in our correspondence to mean the development of linkages between one system and another system *composed of different kinds of phenomena.* The relation of engrams to the trees in the yard across the street would, for example, be a case of cross-organization. Cross-organization is an instance in which *different things in nature* are brought into the same conceptual scheme, whereas the Spinoza principle, if I may so call it, relates to the ways in which the *same things in nature* may take on different appearances and be known by different conceptual formulations.

The Doctrine of Isomorphism with Respect to Communication

This view of cross-organization attempts to find an important place for the doctrine of isomorphism, particularly that type of isomorphism which stresses the fact that the formal pattern existing in the external world may register itself upon our brains, so that quite literally the same geometry may appear in the visual field and in the visual brain functions. One is not so much the duplicate or carbon copy of the other, as simply a manifestation of the same thing. There is pattern-for-pattern isomorphism.

Now I conceive of the communication system as frequently involving this kind of isomorphism. It selects from the welter and flow of the external environment, both physical and social, realities which have their own place in a new system development by the communications theorist. He can play two games. He can do this with materials which are connected with the Spinoza principle, or he can do this with materials which involve the principle of cross-organization.

Personality: Three Levels of Complexity

In the Personality book,[1] near the beginning, I was concerned almost entirely with the cross-organization problem and not with the Spinoza problem. I undertook, in the three following diagrams, to show how real, functional elements within the organism and real, functional elements outside the organism might get caught in the same reciprocities.

All three points of view have their regions of adequacy. In the third view, the uniqueness of the individual is seen to lie in his peculiar capacity for interaction with the environment. Nothing psychological can be observed except in such an interaction field. Man is, then, a nodal region, an organized field within a larger field, a region of perpetual interaction, a reciprocity of outgoing and incoming energies.

Such a view may be called a *field* view, if we understand that no single word is likely to serve perfectly for this conception. The word *field* will perhaps serve if we expressly state that it is used as it is in physics; an electromagnetic field, for example, permits no strict demarcation of a boundary and may change continually as a result of varying currents.[2]

I went on later, as you remember, in Chapter 39, to show that the life history of the person is a history, not of events within the skin of the individual, but of transactions between the individual and his environment. The communication theorist, I think, particularly á la Dewey and Bentley, should be able effectively to use the principle of cross-organization if it has any meaning at all. But the conceptual is dominant over the perceptual in the sense that the history of an individual, especially as it affects his preference patterns, determines the selectivity and structure of the perceptual process—a point on which Pavlov and Piaget agree.

Transaction

I like very much your extrapolation of Richards' "feedforward."[3] But I would supplement your emphasis on verbalization and

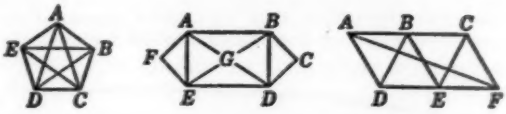
[1] Gardner Murphy, *Personality, A Biosocial Approach to Origins and Structure* (New York: Harper & Brothers, 1947), pp. 3–9.

[2] *Ibid.*, pp. 5–9.

[3] I. A. Richards, "Communication Between Men: Meaning and Language," in Heinz von Foerster (ed.), *Cybernetics, Transactions of the Eighth Conference, March 15–16, 1951* (New York: Josiah Macy, Jr., Foundation, 1952), pp. 45–91.

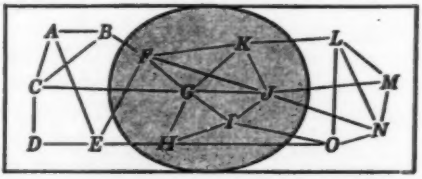
1. A personality is a distinguishable individual, definable in terms of a qualitative and quantitative differentiation from other such individuals.

A, B, C, and D are individuals; their interrelations, their manifest external likenesses and differences, may be studied without reference to their internal organization, which need not even be portrayed.



2. A personality is a structured whole, definable in terms of its own distinctive structural attributes.

The letters constitute parts or attributes, such as the different organs of the body, which stand in specific interrelations.



3. A personality is a structured organism-environment field, each aspect of which stands in dynamic relation to each other aspect. There is organization within the organism and organization within the environment, but it is the cross-organization of the two that is investigated in personality research.

All the functional relations within the shaded area, and between the shaded and unshaded areas, constitute personality. The shaded area is the organism.

emphasis on kinesics with various other kinds of nonverbal communication, including the very important unconscious communications systems which convey so much atmosphere.[4]

I am very much impressed with your use of directional arrows and with the conception of curved and broken lines. I believe the whole Lewinian system could profit enormously by being made shadowy, diffuse, vague, even incoherent, in the manner of William James's "transitive" rather than "substantive" aspects of thought.

I believe that you are completely right in the importance of

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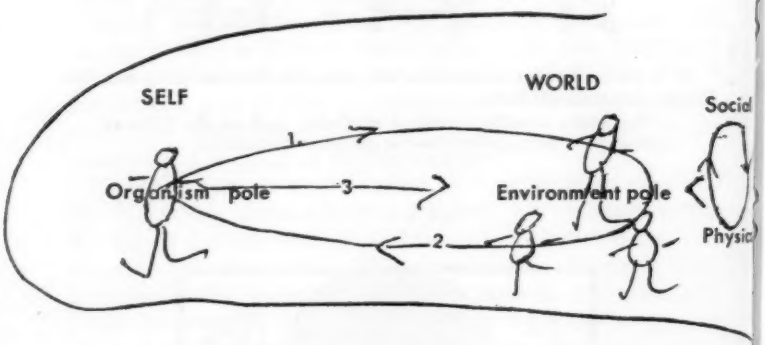
[4] Murphy here is referring to an earlier letter from Sondel, which said in part: "Quite without thinking about it, I invented a diagram of my own for classroom use to explicate your cross-organization. Here it is:



See Murphy, *op. cit.*, p. 5.

"This provides for change at both poles. The individual exerts a degree of control by feedforward (in his *output*, 1) and by the exercise of feedback in subsequent output in entertainment of responsive *input* (2)—i.e., the consequences of his own words, actions, etc. Feedforward begins a verbal pattern, the ending of which is determined (not necessarily, but stochastically) by the beginning of the pattern. *Feedback* is referable to the verbal pattern and may be positive (maintaining) or negative (corrective, 3).

"I use curved (sometimes broken) lines with direction arrows in my own expositions, wherever possible. The geometric designs seem, in contrast, to be rigid." (But, as you indicate, the concept of isomorphism gives geometric designs special usefulness in showing "congruence" of patterns in two different things in nature.)

distinguishing between stable and unstable references, and that to a considerable degree stable references indicate solid, dependable, time-space defined, interpersonally known realities as contrasted with those which have insecure anchorage or have anchorages mainly within the need system or fear system of the individual.[5]

Conclusion

Looking back over what I have written, I see I have not answered directly the question you put. "What is the relationship between the verbal system and the nervous system—patterns-wise? It it one of analogy merely? Are there areas of fusion? Are there areas of identity?" Here I would say that there are many known areas of identity, and these correspond to the isomorphisms mentioned above. But there are many areas simply where we do not know very much about neural organization. And we have, of course, many cases where several different kinds of neural organization all serve the same function, so that the function cannot be set in any simple isomorphic relation with a particular neural activity, except in the very abstract sense that the thing which *all* the neural activities have in common here is something isomorphic with the verbal event—or other event—which they mediate.

Perhaps my main usefulnes at this time is to try to distinguish between organization and cross-organization—that is, between the intra-individual communications system—a system laid down, so to speak, within his own body—and the inter-individual communications system, in which all sorts of cross-linkages—tongue of one, ear of another, heartbeat of a third, etc., have to be sketched into the diagram.

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[5] Here Murphy is referring to an earlier letter from Sondel, which stated in part: "In cross-organization (a concept that has been of incalculable help to me and my students), the primary tool of the individual is words. He is attempting to control change. Change is meaningless unless referred to a stable reference. In my view, the stable reference takes the form of a verbal pattern. I use Wiener's definition of pattern (*The Human Use of Human Beings*, p. 3): 'Two patterns are identical,' he says, 'if their relational structure can be put into a one-to-one correspondence.' When there is such correspondence between a verbal pattern and an actual pattern, we have a statement of fact; when a verbal pattern anticipates an actual pattern, we have, usually, a means-end hypothesis in the Deweyan sense."

THE HUMAN COMMUNICANTS IN COMMUNICATION ENGINEERING

F. S. C. Northrop*

By the human communicants we mean two groups of people—(1) the senders and (2) those on the receiving end.

The senders are a very small class of human beings made up of two closely associated subclasses. The first of these is a very small group, since it includes merely the highest echelons of business executives who direct the manufacturing, management, and use of calculating machines and the communication networks. This subclass, because of stockholders' funds put at their disposal, has the wherewithal to purchase and then control these increasingly expensive cybernetic and communicative gadgets. The other closely associated subclass is composed of the highest military decision-makers and heads of similarly "hush-hush" research corporations who, thanks to taxpayers' federal funds put either directly or indirectly via the military at their disposal, are also able to buy and direct the use of these expensive machines.

The receivers are a very large group. These embrace all the rest of mankind.

What has to be realized also is that the manufacturers of calculating machines are already at the major breakthrough point in their research at which these teleological mechanisms are being transformed from merely calculating into "creatively imaginative" problem-solving machines. What this may mean is that, whereas in the past we have had to wait several decades and even centuries for basic technical problem-solving men of genius, such as Eudoxus, Chrysippus, Aristotle, Newton, Maxwell, Gibbs, Einstein, and Heisenberg, to appear, these mechanisms, because of their even greater cost, are going to be put in the hands of these very few business and military men, subject only to the democratic control of that rubber-stamping farce called a stockholders' meeting and, in the case of the hush-hush military, not even to that, and these men are going to possess the most advanced and informationally confirmed ideas in the world.

That these developments raise moral, legal, and political problems that have yet to be even envisaged by the overwhelming majority of mankind who are on the receiving end of what is

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called communication engineering, hardly needs to be pointed out. It is to the credit, however, of at least some of the business and military leaders that they are sensitive to the human moral, legal, and political aspects of this situation and the human moral and legal responsibility which they personally and their firms and military establishments carry. The recent experiences of the executives in the electric utility manufacturing industries are likely to make them even more aware of this responsibility.

It must be said also in fairness to one at least of the firms involved in this recent moral and legal scandal that the research department of its management division has been working on a theory of management in which the latest research by philosophers and lawyers on the criteria of moral goodness and legal justice are being combined with the technological efficiency in the manufacturing division and high-pressure communication in its sales department. The plain fact probably is, therefore, that few manufacturing firms whose moral and legal skirts are at the present clean have such an advanced theory of management, even on the research planning board. Until such an approach to business, law, and ethics is both taught in our business and law schools and incorporated in the living practice of both our business and our military establishments and also in the foreign policy decision of our federal government, it is unlikely that these moral and legal problems of our contemporary technological predicament will be resolved.

But this is only one piece of the problem. In addition to these narrowly controlled computing and creative thinking machines and their allied broadcasting networks, there are also the Pavlovian conditioned-reflex and Professor B. F. Skinner's learning-theory techniques of the behavioristic psychologists. These techniques are in the hands not merely of the aforementioned small group of top military and business decision-makers, but also in those of the not too morally scrupulous publicity officers of the successive Presidents of our Federal Government and the Madison Avenue advertising men whose offices are often, for obvious reasons, in the same buildings with the broadcasting corporations. The nature of the techniques of both Pavlov and Professor Skinner is that, unless one is a very sophisticated person with respect to the most difficult of all questions—the question

whether moral, legal, and political decisions are significantly true or false—the users of these techniques are likely, quite innocently and unconsciously, to treat the human beings on the receiving end of the communication networks after the manner in which Pavlov treated his dogs and American behavioristic psychologists treat their experimental guinea pigs. In short, one treats each human being as if he or she were a pawn or mere means and this, as Kant saw, is to be immoral. It is also to do something that is unjust and illegal even though our present laws do not make it so. In other words, it is to behave toward people in a way that is incompatible with the moral, legal, political, and religious ideals of free men and women in the Free World.

That such is the case is shown by the behavior of the aforementioned business and military men and the behavioristic conditioned-reflex psychologists themselves. They jolly-well do not allow themselves to be put at the receiving end of the communicating process in the position of Pavlov's dog or one of their guinea pigs. Hence, without realizing it or stating it consciously in their scientific publications, they presuppose the existence of moral, legal, political, and religious, freely assenting and dissenting human beings, so far as they themselves are concerned, even though the rest of us have not yet awakened to this fact.

The time, therefore, has come for the rest of us to wake up and to awaken them to the overt consciousness of the moral, legal, political, and religious standards of free assent and dissent which they themselves unconsciously practice and insist upon being applied to themselves. We, like them, are not Pavlovian dogs, but freely assenting moral, legal, political, and religious human beings. Hence, the moment is here for all of us to treat one another this way. In short, in communication engineering, as in everything else, the individual person must be treated as an end and not as a means.[1]

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[1] This conclusion has very important implications with respect to: (1) The present division in the Supreme Court of the United States about how the principle of religious and civil liberties in the Bill of Rights is to be interpreted. (2) The recent self-defeating American fiasco in Cuba and U.S. foreign policy generally. And (3) the relation between law and morals. For a preliminary specification of these implications, the interested reader may find of relevance the writer's *The Complexity of Legal and Ethical Experience* (Boston: Little, Brown, & Co., 1959) and *Philosophical Anthropology and Practical Politics* (New York: The Macmillan Company, 1960).

VALUES, PROBLEMATIC AND UNPROBLEMATIC, AND SCIENCE

CHARLES MORRIS*

It is very difficult to say in a few words anything new or illuminating about the relation of science to human values. In recent years there have been hundreds of articles and books on this topic.[1] The differences of opinion expressed are very great. This is due in part to the fact that there are diverse analyses of the terms *science* and *value*, and hence different possible conceptions of the relationship of science and value. The situation is further complicated in that there is no general agreement about the nature of evaluative utterances ("judgments of value") as contrasted to scientific utterances ("judgments of fact"). Hence, the relation of "the ought" to "the is" is still in constant dispute. In this situation one can in a short article hope at best to sketch one possible direction of analysis.

VALUES: UNPROBLEMATIC AND PROBLEMATIC

Human beings under certain circumstances *do* somewhat consistently prefer some things to others, and believe that under certain circumstances they *would* prefer certain things or situations to others. We may speak of *operative values* in the first case and of *conceived values* in the second. (A third type of value—*object-values*—will appear later in the account.) At any given moment, for a given person, some operative values and some conceived values are unquestioned, unproblematic. A value problem arises when doubt appears as to whether one should prefer a certain thing to others or whether one should continue to accept a certain conceived value. Thus in a problematic value situation some value has become questionable, but only within a context of other values that are, in that situation, unproblematic.

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* Dr. Morris, formerly on the faculty of the University of Chicago, is now at the University of Florida.

[1] See Ethel M. Albert and Clyde Kluckhohn, *A Selected Bibliography on Values, Ethics, and Esthetics in the Behavioral Sciences and Philosophy, 1920–1958* (Glencoe, Illinois: The Free Press, 1959). Items on science and values are brought together on pp. 31 to 35.

The Evaluation Process and Scientific Inquiry

Evaluation will be taken to be the reflective process in which one attempts to decide upon the course of preferential behavior. Knowledge is of course relevant to this process of evaluation, and the more scientific it is the better. One needs to know as fully and as accurately as possible the consequences of accepting one or another operative or conceived value. So as a phase of evaluation one considers the consequences of various possible courses of preferential behavior, and this may within limits be done scientifically.

What, however, selects among these possible consequences? The answer proposed is that the unproblematic values in the given situation act as the norms (standards, criteria) in terms of which behavior with one set of consequences is selected rather than behavior with another set of consequences.

If this analysis is correct in direction, it indicates why a formulation of what ought to be done is never strictly deducible from statements as to what is or will be the case. This is so since unproblematic values always partially control the evaluation process. If action A leads to consequences X and action B to consequences Y, it is not possible to say that one action ought to be performed rather than the other unless there is present an unproblematic value which favors action with one set of consequences rather than action with the other set of consequences.[2] Actions A and B, for instance, may be two methods of performing surgical operations for a given ailment, and it may be known that action A leads to more deaths and complications than does action B. A surgeon with the unproblematic value of acting in a way that minimizes deaths and complications will correctly conclude that he ought to operate in manner B, but a Devil with the opposite unproblematic value will correctly conclude that operation in manner A should be performed. The opposing arguments are not logically contradictory, for while the same knowledge is shared by both parties, the unproblematic values are different in the two cases.

It is clear that science can play a very important part in evalua-

[2] This part of the argument is indebted to the views of Clarence I. Lewis. See Chapter 4 of his book *The Ground and Nature of the Right* (New York: Columbia University Press, 1955).

tion even though unproblematic values are always present. It can in some cases give knowledge as to the consequences of alternative modes of action. And the method of scientific inquiry—that is, the scientific habit of mind—can be used, as we shall see, within the process of evaluation to improve some of its phases.

It is also clear, however, that evaluation plays an important part within scientific inquiry. For the scientist in any situation also has his unproblematic values (such as the obligation to consider all relevant evidence), so that evaluation is constantly present in the scientist's reflective activity.

Modes of Language Provide Criteria as to the Nature of the Problem

How then are we to understand both the similarity of scientific inquiry and evaluation and yet express their differences? Let us regard inquiry in general as the reflective process directed to solving a problem.[3] Now problems are of various sorts: Problems of what has happened, is happening, or will happen; problems of what to prefer; problems of what to do. Inquiry will terminate in three different kinds of assertions with respect to these three different kinds of problems. An examination into the modes of language will provide criteria for distinctions and relationships.[4]

Inquiry into what has happened, is happening, or will happen terminates with designative statements ("statements of fact") and may be called designative inquiry. "The earth is five billion years old" is an instance of a designative statement. Empirical science (as contrasted to mathematics) may be regarded as one form of designative inquiry.

Inquiry in what to like terminates with appraisive utterances ("judgments of the good") and may be called appraisive inquiry. "Music A is better than music B" is an instance of an appraisive utterance. The field of criticism represents one form of appraisive inquiry.

Inquiry into what to do terminates with prescriptive utterances

[3] The following discussion of inquiry is much indebted to certain ideas of John Dewey's analysis of inquiry: *Logic: The Theory of Inquiry* (New York: Henry Holt & Company, 1938).

[4] See Charles Morris, *Signs, Language, and Behavior*, Chapter 3, "Modes of Signifying" (New York: George Braziller, Inc., 1955).

("judgments of right") and may be called prescriptive inquiry. "In case of disease X, operate in manner B rather than in manner A" is an instance of a prescriptive utterance. Technology, used in a wide sense, represents a field of prescriptive inquiry.

What we previously called evaluation covers both appraisive and prescriptive inquiry. Some thinkers—such as C. I. Lewis—in order to emphasize the differences between these two forms of inquiry think it best not to use, as we have done, a common term to cover both of them. For present purposes, however, the term "evaluation" will sometimes be used in the more inclusive manner.

Now the important point is that in conducting *any* of these forms of inquiry, the other forms of inquiry are used at various stages of the process. Thus the scientist, in moving toward designative statements, is constantly appraising one hypothesis as better than another and prescribing to himself various courses of experimentation. A similar situation obtains for the critic and technologist. So what we have called forms of inquiry are phases of, and emphases within, a more general process of inquiry.

Thus there are differences between science and evaluation in respect to the terminal kind of utterance, and yet many similarities in the two processes of inquiry. It can, I believe, be argued that more use of scientific knowledge and scientific method would improve evaluations (or at least many evaluations) without blurring the distinction between making a scientific statement and making an evaluation. Evaluations always involve unproblematic values *as premisses*; while the scientist too has unproblematic values, they do not act *as premisses* in drawing his conclusions.

A point implicit in the preceding account should now be made explicit. While one or more values are *in a given situation* unproblematic and act as norms, any one of these unproblematic values can be made a problem for inquiry *in another situation*, which will in turn have its own unproblematic values. So there is no value which is not subject to evaluation, although all values are not subject to evaluation at the same time. And insofar as scientific results and method are used in these evaluations there is no part of the domain of values upon which science is barred from having an influence.

Stability in Human Values

It does not follow that there are not great stabilities in the domain of human values.[5] Social scientists today are calling attention to certain basic values which all cultures must have if they are to meet the problems which must be met if the culture is to endure. For instance, that adults should talk with young children is an unproblematic value in all cultures and has seldom, if ever, been questioned. If it were questioned, the social scientist and psychologist could point out that without language the child would never become a developed human being, and a society without language could not transmit its culture and could not endure. Under inquiry the value of adults talking with children would for most persons remain unscathed. Nevertheless, what has been said in general holds here too: to say that adults should talk to children is to make an evaluation, and if accepted it is not on the basis of designative statements alone but also because of the acceptance of unproblematic values in the human situation: adults wish children to become adults and they wish their culture to continue.

Dynamic Interaction of the "Is" and the "Ought"

In evaluation, persons believe that one object is such that they do indeed prefer it to others or that they would indeed prefer it to others if it is made available. ("Object" is here used very widely for things, persons, kinds of society, ways of life, etc.) The capacity of an object to sustain preferential behavior may be called its *object-value*.[6] Thus a room with a temperature of 75 degrees has greater object-value as a living quarter for human beings than a room with a temperature of 150 degrees. Beliefs as to object-values, like other beliefs, may be true or false. Hence here is another place where scientific knowledge and method are relevant to the making of evaluations. We need to know not only what operative and conceived values persons do in fact have,

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[5] My study *The Varieties of Human Value* (Chicago: University of Chicago Press, 1956) stresses both the differences and the stabilities in human values and shows that these can be studied scientifically. It does not deal to any extent with the relation of science and evaluation.

[6] For an illuminating analysis of "value in objects" see Book III, Chapter 17, of C. I. Lewis, *An Analysis of Knowledge and Valuation* (La Salle, Illinois: Open Court Publishing Co., 1946).

but whether the objects referred to by these persons do in fact have the object-values they are thought to have.

In terms of the preceding discussion it is misleading simply to say that science tells us what is (or was, or will be) while evaluation tells us what ought to be. It is true that evaluation involves an accepted unproblematic value as a norm. But as we have seen, this unproblematic value can itself, under other conditions, be evaluated, and knowledge, including scientific knowledge, enters into this evaluation. So while what is preferred is not necessarily what ought to be, the determination of what ought to be is influenced by a wider knowledge of what is or will be. A child who refuses to eat a certain kind of food is told that he ought to do so. Back of this injunction lies a consideration of what the child *is as a growing system*—i.e., what he will be later if he does not now eat the kind of food in question. It is in terms of such knowledge (together with certain unproblematic values) that the injunction in question is favored by the adult and may come to be accepted by the child.

The "is" and the "ought," while not identical and while not strictly deducible from each other, are in fact in dynamic interaction and mutually influence each other. The knowledge of what is and what will be under certain conditions is one factor in the control of conceived values as to what ought to be, and the acceptance of certain conceived values is one factor in the determination of what is and what will be. Such is the dynamic interaction of science and evaluation.

But Can It Talk?

With the assistance of human operators and a Flexowriter which is wired to it, the machine [the Western Reserve Searching Selector] scans the encoded abstracts of scientific articles and produces in typewritten form a bibliography of existing knowledge on a given problem. It can work on ten questions simultaneously.—Allen Kent, "A Machine That Does Research," Harper's Magazine, *April, 1959.*

THE FACTOR OF RELEVANCE IN THE SERIAL REPRODUCTION OF INFORMATION

F. L. Brissey*

Serial reproduction refers to a process in which the first in a series of individuals receives a message which he is required later to reproduce. The first individual's reproduction becomes the message which the next person in the series receives, his reproduction in turn is the message which the third receives, and so on.[1,2] This process appears to be a suitable paradigm for a considerable share of socially significant communication; additionally, it lends itself readily to the investigatory procedures of the communications laboratory.

Recent investigators of the process are generally agreed that inaccuracy (largely in the form of distortion and deletion) is the most impressive single characteristic of the process.[3,4,5] This finding combined with the presumed social significance of serial reproduction appears to justify an additional study designed to investigate the conditions under which the loss and the distortion of information are minimal. This general end motivated the present study.

For the purposes of this investigation *communication* is defined simply as a process in which the symbols representing information are transmitted from one individual or group to another.[6]

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This article is based upon a dissertation submitted in partial fulfillment of the requirements for the Ph.D. degree in Speech Pathology and Audiology. The author is indebted to professors Wendell Johnson and Earl Schubert for the advice and guidance which made the research possible.

[1] J. A. McGeoch, *The Psychology of Human Learning* (New York: Longmans, Green & Co., 1948), p. 339.

[2] F. C. Bartlett, *Remembering* (London: Cambridge University Press, 1932), pp. 118–176.

[3] M. E. Tresselt and S. D. S. Spragg, "Changes Occurring in the Serial Reproduction of Verbally Perceived Materials," *Journal of Genetic Psychology*, LVIII (1941), 255–264.

[4] C. Wood, "An Analysis of Changes Occurring in the Successive Stages of Verbal Abstracting," M.A. Thesis, The State University of Iowa, 1944.

[5] G. W. Allport and Leo Postman, *The Psychology of Rumor* (New York: Henry Holt and Co., 1947), p. 247.

[6] Claude Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1949).

Ideally the information received is an exact duplicate of that which is sent. The term *information* designates a prescribed set of one or more true, factual statements each of which is both pertinent and relevant to a specified nonverbal event or state of affairs. *Pertinence* refers to that portion of information which is true in respect to a specified event or state of affairs. *Relevance*, in turn, relates to those pertinent statements which deal with a specified hypothesis or question. Presumably, the statements comprising this smallest set may be further ordered on a continuum of relevance. Thus, a given statement may be pertinent but irrelevant; and if relevant, it may be relevant to some stated degree.

In order to evaluate the accuracy with which information has been transmitted in a given situation, one must appraise the degree to which each participant is *informed*. The state of being informed may be defined in terms of (*a*) the degree to which an individual can recognize or reproduce the statements comprising the original message and (*b*) the relevance values of these statements. Investigatory procedure, accordingly, requires (*a*) a specified, nonverbal event which can serve as the basis for a message, and (*b*) a hypothesis or a question about the event which can serve as an anchor point for estimating the relevance values of the statements forming the message.

The central hypothesis which guided this inquiry pertains to the foregoing conception of communication. In addition, the writer assumed that all communicants in the experiment should have the same relevance "set"—i.e., all of them should be concerned with the same central question. More formally stated, the hypothesis was that *under conditions of a common relevance set and with respect to those statements considered most relevant to a specified hypothesis, the participants at all levels of serial reproduction will be equally well informed.*

Procedure

A professionally produced sound motion picture entitled "Hit and Run Driver" was the basis of the experiment; the writer prepared a set of true, pertinent statements concerning it and scaled each of these for relevance according to the method of

equal-appearing intervals as described by Lewis and Sherman.[7] He assembled eighty-one pertinent statements of a relatively simple grammatical construction and used two independent groups of judges to assess the reliability of the scaling process. The instructions to each group which saw the film twice consecutively were to acquaint themselves as thoroughly as possible with the methods employed in apprehending the guilty person. Immediately after the second viewing, the judges assigned relevance values to each of the eighty-one statements with a scale value of *one* designating "least relevant" and a scale value of *nine* indicating "most relevant." Median scale values and semi-interquartile range values then were computed for each of the statements.

Since a statistical evaluation of the obtained values revealed no significant differences in the performances of the two groups, the data were pooled for use in the next procedural step.

The *Q*-values for sixty-one of the original eighty-one statements were considered sufficiently small (2.0 or less) to warrant their use in the main investigation. These retained statements became true items in the construction of a true-false criterion test, and each item was weighted with the appropriate relevance value. Then the writer prepared sixty-five logically incompatible false items, added these to the true items, and arranged the total set in a random order. Responses to the true test items were the basis for evaluating the degree to which the experimental communicants were informed about the original event (the sound motion picture).

One hundred and eighty undergraduate college students served as subjects in the main investigation. They were divided into five groups, each composed of thirty-six persons. Those in Group I, representing the eyewitness observers who derived their information directly from the film, immediately after seeing it were instructed to write a complete and accurate report regarding the methods employed in apprehending the guilty person. These reports were distributed randomly, one to each, to the members of Group II. These subjects were instructed to read the report only once and then to write their own accounts in accordance

[7] D. Lewis and D. Sherman, "Measuring the Severity of Stuttering," *Journal of Speech and Hearing Disorders*, XVI (1951), 320–326.

with the same instructions as those given Group I. The reports of Group II similarly "informed" the members of Group III concerning the original event. The procedure was repeated for Groups IV and V.

No specific set was provided for the observation of the film by Group I nor for the reading of reports by the subjects of the subsequent groups. All groups, however, received the same relatively specific instructions with regard to writing the required reports. It was these common instructions which provided a relevance set for all subjects and which formed the basis for relevance scaling in the preliminary investigation.

The criterion test described earlier was administered to the members of each group immediately following the report writing described above. The number of true test items correct, incorrect, and omitted was assumed to represent the relative degree to which a subject was *informed*, *misinformed*, and *uninformed* respectively. The subjects were instructed not to guess. Thus, an analysis based on responses to the true test items and to the relevance values of the items provided an assessment of the relative *amount* and *importance* of the information, the misinformation, and the lack of information characteristic of each group. The false items were not employed in the analysis largely because they were logically incompatible with the true items and therefore added no new information regarding the degree to which the participants were informed.

The statistical method was the analysis of variance, which was used to evaluate the differences between the mean scores for each of the five groups for test items correct, incorrect, and omitted. A random replications design was employed, and the five per cent level of significance was utilized for all tests. In the interest of brevity the detailed results of the analyses have been omitted. However, all computed F ratios were significant.

Results

Table 1 presents for each of the five groups the means of the total relevance weightings of the correct, the incorrect, and the omitted items recorded on the test papers of the individual subjects. There is clearly a marked reduction in the relative amounts of information retained at each of the levels of reproduction, and

TABLE 1

The Mean Relevance-Weighted Criterion Test Scores for Participants in Serial Reproduction (Informed, Misinformed, and Uninformed)

Response Category	Group Means				
	1	2	3	4	5
Correct	226.3	105.5	84.7	50.6	43.9
Incorrect	17.0	27.9	20.9	10.6	8.8
Omitted	14.9	124.6	152.0	196.8	205.3

this result is consistent with expectations derived from previous investigations. However, the data for items incorrect reveal a progressive *decline* in the amount of misinformation, and the total data show the subjects of all groups to be more informed than misinformed. The peak of misinformation occurs with Group II. The values indicating a lack of information are, in general, reciprocally related to those for information. Jointly considered, these data indicate that the groups from the original source are characteristically more uninformed than misinformed.

Table 2, which presents the mean relevance values for the test items that the subjects marked correctly, missed, or omitted, gives fifteen estimates of the significance of the information which the subjects received, misconstrued, and failed to obtain, respectively. In all groups the information retained is of greater relevance than is either the misinformation or the lack of information. The average relevance for the items indicating misinformation is moderately low and shows a systematic decline from Group II to Group V. Conversely, the relevance values associated with a lack of information tend to increase slowly. In other words, in successive stages of serial reproduction, information of ever increasing importance is lost.

TABLE 2

The Mean Relevance Values for Criterion Test Items Correct, Incorrect, and Omitted for the Participants in Serial Reproduction

Response Category	Group Means				
	1	2	3	4	5
Correct	4.53	6.58	6.55	6.51	6.12
Incorrect	3.39	5.01	4.49	3.95	2.84
Omitted	1.92	3.26	3.41	3.83	3.87

TABLE 3
The Relative Amount of Material (Mean Number of Words) Produced by the Participants in Serial Reproduction

	Group Means				
	1	2	3	4	5
Words Produced	380.0	218.1	149.7	117.2	91.2

Another measure of the serial reproduction effect is simply the average length of the message produced at each of the reproduction levels. In view of the reciprocal relation between the values for informed and uninformed, it is reasonable to expect a significant abbreviation in message length through the communicative chain. Table 3, which indicates a marked, systematic reduction in message length as serial reproduction proceeds, corroborates this presumption.

A study of individual chains, however, reveals pronounced variations from one to another. It appears that the accuracy and the completeness of a given chain is closely related to the effectiveness of the individual communicants. A relatively ineffective message midway through an otherwise excellent chain markedly and irreversibly curtails the content of the series.

Of the sixty-one true statements utilized in the criterion test, eight received median relevance values equal to or greater than 8.0. These statements may be considered to comprise the "most important message."

Table 4 shows the extent to which these eight key items were correctly identified, incorrectly received, and omitted by each of the five groups. These data suggest that the tendency is to lose critical information rather than to be misinformed. Whereas Group I received approximately ninety-four per cent of the most important parts of the message, Group V, following a progressive attenuation, apprehended only approximately thirty per cent.

TABLE 4
The Mean Number of True Test Items (Relevance Values $\geqslant$ 8.00) Correct, Incorrect, and Omitted by the Participants in Serial Reproduction

Response Category	Group Means				
	1	2	3	4	5
Correct	7.6	5.0	4.2	2.6	2.4
Incorrect	.4	1.0	.5	.3	.1
Omitted	.0	2.0	3.3	5.1	5.5

Discussion

A secondary aim of this investigation was to determine the feasibility of assessing the relevance which a given statement bears to a specified hypothesis. The close correspondence between the scale values which the two groups assigned suggests that relevance is a concept which future studies in communication may employ reliably. Since the significance of the items successfully transmitted as well as the number of items passing to a receiver is important in assessing the effectiveness of communication, demonstrating the feasibility of relevance scaling seems to constitute a worth-while contribution.

Generally considered and within the limitations imposed by the nature of the samples, the materials, and the procedures, the data show a marked and progressive loss in the amount of information transmitted from one stage to another in the process of serial reproduction. These results clearly do not support the guiding hypothesis. However, the mean relevance values of the information possessed by each of the groups indicates that the degree of importance of the information received, as Table 2 indicates, is nearly equal and moderately high for all groups except the first. (The first group achieved such high scores on the criterion test that the mean relevance value for correct test items approximates the mean relevance value for the total test.) This finding suggests that although the total amount of information at the successive levels of reproduction declines those items which are retained tend to be the most important.

In respect to misinformation, the evidence supports the interesting and rather important conclusion that all groups were impressively more informed than misinformed. This finding, it should be noted, is contrary to the implications of previous investigations. Bartlett, for example, states, ". . . the final result, after comparatively few reproductions, would hardly ever be connected with the original by any person who had no access to some intermediate versions."[8] The present study, however, differs rather markedly from preceding ones in general design, materials, and method of evaluation, and it differs specifically from them in that it provided for the same relevance set at all

[8] Bartlett, *op. cit.*, p. 171.

levels. A conservative conclusion appears to be that the present results demonstrate that a violent modification of the initial material is not a *necessary* consequence of serial reproduction. The facts that the loss was less for the important parts of the message than for the unimportant and that virtually no misinformation occurred in respect to the eight most highly relevant items give further support to the preceding conclusion.

Thus the results of this investigation indicate that successive groups were not equally well informed and that the decline in information is a result of *omission* rather than of *distortion*. A continued search, therefore, is needed for those factors which promote the retention of information. In general, the goal of research in the serial reproduction framework perhaps should be to discover and evaluate whatever factors may serve to maximize the effectiveness of communication. A concomitant of such an improvement in accuracy will be an increased reliability of prediction regarding the probability that a given initial message will reach the terminal receiver of a communicative network.

Summary and Conclusions

The central objective of this investigation was to evaluate the accuracy of serial communication under conditions of a common relevance set. The experimental hypothesis required that under conditions of a common relevance set and with regard to the most important information for a specified hypothesis (or question), the participants at all levels of serial reproduction would be equally well informed.

Under the condition of this study and for the subjects and the materials employed, the results support the following conclusions:

1. Statements may be reliably and usefully scaled on a continuum of relevance by the method of equal-appearing intervals.
2. The eyewitness group is the best informed, the least misinformed, and the least uninformed of the five groups.
3. A progressive decline in the degree to which the successive groups are informed occurs during serial reproduction; however, the average relevance value of the information retained tends to remain at approximately the same moderately high value for all groups except the eyewitness group.
4. All groups are relatively more informed than misinformed

in terms of both the amount and the relevance value of the information possessed.

5. Successive groups are progressively more uninformed than misinformed with misinformation remaining relatively low and constant for all groups.

6. The amount of material reproduced at the successive levels of serial reproduction progressively declines to approximately one fourth the amount of material produced by the eyewitness group.

7. The relative degree to which the successive groups are informed with regard to the "most important" message progressively declines from approximately ninety-four per cent of the message for Group I to approximately thirty per cent of the message for Group V.

OPERATIONAL ASPECTS . . .

(Continued from page 189.)

ifiable state of readiness for internal and external adaptive activity. The problem of communication is thus in observer-language the problem of evoking in the receiver a desired state of readiness. The most economical process (encoding and decoding) uses physical signals not to *depict* but to *select* a standard representation of a symbol at the receiving end.

The communication engineer measures the selective-information-content of such signals, not in terms of the selective operation performed by the symbols on the ensemble of states of readiness of the human receiver, but of the selective operation performed by the signal on the ensemble of symbols. The symbols are represented in this ensemble in the proportions in which they normally occur, the most frequently used occupying the largest space and being most easily selected.

Since the ensemble of states of readiness of the receiving human being may have quite different proportions, it should now be clear why the selective-information-content estimated by the engineer and the selective-information-content estimated by the receiver may be numerically different quantities, though the concepts denoted by the term are one and the same. Selective-information-content, in fact, measures not a *stuff* but a *relation* (selective power or selective function) between a signal and an ensemble. Confusion would often be avoided and debate dissolved if the ensemble were defined with every estimate.

GROUP DYNAMICS TECHNIQUES AND THE TEACHING OF COMPOSITION

BERNARD KNIEGER*

The purposes of this paper are (1) to describe briefly certain techniques which the writer believes to be applicable to the teaching of composition and (2) to report the results of a modest experiment comparing the attitudes of students in an experimental section with those in a class taught by conventional methods. The size of the experiment is too small to justify generalizations, but both the nature of the teaching techniques and the results should be of interest to other teachers of composition and communication. Replications of the experiment with corroborative findings could lead to significant generalizations.

EXPERIMENTAL TECHNIQUES

The writer conducted the experiment in two sections of beginning freshman English which he taught at the University of Wisconsin in Milwaukee. The students in both sections studied a textbook, read expository essays, and wrote ten themes, but those in Section A (the experimental group) were taught in part through applications of techniques taken from group dynamics whereas those in Section B (the control group) received instruction of a conventional type.

Among the special techniques employed in Section A, seven are representative. First, seating was in a circle to facilitate interaction. Since the rationale for instruction in the experimental group was the belief that active participation by the student facilitates the learning of communication skills, this seemingly simple variation in the normal procedure was more important than the reader may at first believe.

Second, the instructor divided the class into discussion units of from six to ten students so that the individual had greater freedom than he usually does to express himself, more of an opportunity to do so, and a heightened pressure from his peers to contribute his share. The values of this procedure, however,

* Dr. Knieger (Ph.D., Harvard University, 1952) participated in a group dynamics laboratory and seminar at the University of Wisconsin in Milwaukee, where he was an assistant professor of English, and in the National Training Laboratory in Group Development at Bethel, Maine; his "A Delegate Looks at Bethel" appeared in the March, 1960, issue of *Adult Leadership*. At present he is a faculty member of Washington State University.

go beyond those which are largely self-evident: buzz sessions (as this technique is labelled) can alter the entire atmosphere of the classroom, as the following example illustrates.

While the buzz groups were discussing the role of trust in communication, one of the students took the position that you can't trust anyone—"Not even your mother," she replied in answer to that query. Incredulity from her fellow discussants and later from the rest of the class, needless to say, resulted. The class, however, quickly perceived that as long as their primary motivation was to show this girl how "wrong she was" communication broke down. Moreover, they saw that if the writer or the speaker ignores the necessity of being *tactfully* honest, communication likewise breaks down. And so, Section A considered the roles of trust, understanding, clarity, tact, honesty, open-mindedness, and other key concepts through their emotional involvements in these matters and not as arbitrary problems brought up by the teacher. Thereafter, even "average" students began to use the assigned theme topic as a means of purposeful exploration rather than as an unmotivated assignment.

Third, the students acted out problems through role playing. For example, those in Section A, after the instructor had returned their first two themes, still could not grasp the standards which he expected them to meet. When the inevitable question "What do *you* want?" arose, he asked for three volunteers to play the roles of confused students meeting in the Student Union; one of them was to be sympathetic with the teacher's behavior. In the discussion, this particular freshman, whom the others viewed as a peer rather than as an outside figure of authority, eloquently justified the necessity for students to write simply rather than in flowery language, to document key assertions, and to follow other principles of effective writing.

Fourth, the students in Section A engaged in self-evaluation. All class members brought in lists of standards for judging their progress as individuals and as group members, and a student committee of three volunteers put these ideas into a usable order. For example, the last of the ten items was as follows: *"Observation*: Do I observe all events and ideas that may, in the future, be of value to me either in theme, class discussion, or simply daily living? By purposeful observation is meant the purposeful

attempt to store this knowledge in my mind." Going over these standards—not didactically but according to individual motivation—constituted a good review of much of the semester's work.

Fifth, rotating secretaries summarized the class discussion of the previous meeting. Thereby, the group became aware of what they had learned, and repetition reinforced the earlier instruction.

Sixth, the students participated in decisions on the syllabus. For example, when in the first meeting the majority of the students of Section A expressed fear of the impromptu theme, the instructor postponed this assignment.

Seventh, the students filled out three course-reaction sheets. Not only did these evaluations produce worth-while information for the instructor, but also they forced the students to consider both the purpose of the course and their relationship to this objective. Moreover, when the instructor reported the results, the students saw, for example, that their own fears were not uncommon and that other students also were apprehensive about participating in class discussions lest they be wrong. This insight enabled the group to participate more actively thereafter.

These seven techniques, in conclusion, were important less for themselves than for the altered classroom atmosphere which collectively they produced. The writer's opinion is that the experimental and the control sections did differ significantly in respect to the variable which he investigated.

Results and Conclusions

1. The students had a more favorable over-all opinion concerning Section A (experimental) than they did regarding

Table 1

Student Responses to a Questionnaire Calling for an Over-all Rating of the Course

	At the end of the first five weeks		At the beginning of the period when group dynamic techniques were used in "A"		At the end of the semester	
	A	B	A	B	A	B
Excellent	2	3	3	1	1	1
Very good or excellent	0	0	0	0	2	0
Very good	8	11	15	4	15	3
Good	13	10	9	13	8	14
Fair	2	3	3	6	0	4
No rating	0	1	0	0	0	0

Section B. Whereas on the first administration of a questionnaire at the end of the fifth week the opinion was slightly more favorable in respect to "B" than to "A," two later sets of responses showed that "A" was the more highly rated.

2. Responses to a questionnaire calling for specific reactions to the courses indicate that interaction among students in Section A was a major factor affecting the general opinion.

Those in A commented favorably upon the circular seating, the informality, the freedom to express ideas, and the stimulation of thought. One student wrote: "In many English classes, the teacher does *all* the talking, which can be boring and unstimulating." Another wrote: "*Student Interaction*—I think that this phase of the course is the most significant. It gave the student the chance to express his view while learning the views of others, thus stimulating his desire to learn the logical ideas on a given matter." Criticisms were varied; three students mentioned student antipathy. In contrast, the students in Section B regarded the analysis of mimeographed student themes as the most significant activity (fourteen of twenty-two mentioned this),[1] and eight students thought that class discussion was the chief weakness.

3. The students in Section A were more willing to recommend their class to a friend than were those in Section B. Twenty-three would recommend A, two would do so to some friends but not to others, and only one would not; of those in B fifteen would recommend the class, one would do so to a certain type of friend, and six would not. This measure of over-all reaction produces data consistent with those which item one in this section reports.

Among the objections to Section B, one is pertinent to this paper: "I think there are better English classes in this school that a friend could do better in, those which have class discussions that are really discussions and where he could learn a great deal more."

4. According to their own testimony on the questionnaires, the student interaction in Section A effected changes in student attitudes and beliefs: that is, the depth of learning was greater than that which generally takes place in the average freshman

[1] Students in Section A also approved this teaching device, but they found many other features worthy of praise.

(Continued on page 240.)

RESEARCH NOTES

FRANCIS A. CARTIER, *Editor*

If you have been making a review of the literature in some particular aspect of communication lately, perhaps you too have been dismayed by the vast amount of uninformative verbiage that is being published. Isn't it about time we set some new standards for conciseness in research reports? The amount of detail we require in papers from graduate students is probably unnecessary in most of the articles we write for publication. Furthermore, I suspect that many of the articles published these days are motivated more by the publish-or-perish policy of some colleges than by a desire to make a contribution to the study of communication.

It is widely believed that the pressures for publication are strongest in the humanities departments. Apparently that is not so. A while back, *Astronautics* carried an editorial by Howard Seifert, President of the American Rocket Society. The "publish for prestige and pay" situation "goes double for the sciences," says Seifert, and the result is a lot of trash. "Perhaps," he concludes, "it is time to . . . give a Pulitzer Prize to the journal which has most impressively refrained from publishing on subjects not worth writing about." Seifert neglects to tell us how to identify such subjects, but his idea is attractive.

Walter W. Stevens, "Polarization, Social Facilitation, and Listening," *Western Speech*, XXV (Summer, 1961), 170–174.

Stevens pleads for greater effort to investigate some of the group forces that influence individual opinion and decision making. He discusses his subjects with great clarity and in a manner calculated to show that they are of far greater significance than the amount of research done on them would imply.

"Polarization is strong group cohesiveness, unity. . . . The speaker . . . may use humor to get his listeners to laugh together; he may ask for a show of hands; he may get them to sing or chant together; he may ask them to stand together, kneel together, pray together, rise together, sit together, or read together. These procedures are repeated again and again for it takes time to polarize a group; but, as most skillful orators know, it is well worth the effort." A polarized listener "tends to relinquish his own set of values and to adopt the values of the audience." This may happen no matter how hard he tries to maintain his own criteria and intellectual independence.

The phenomenon of social facilitation is similar. "It is a radiation of social influence which can be obvious but more often occurs subliminally." It is related to and relevant to pressures to conformity.

These phenomena are not necessarily evil, but should be understood by an educated populace. Unfortunately, we are not yet able to explain them adequately.

Anonymous, "The 'You-Know-What-I-Mean' Attitude," *The American Business Writing Association Bulletin,* XXV (May, 1961), 17–19.

This article is devoted to the maddening circumstance in which a student brings a corrected paper back to the instructor and says, "Why did you mark this 'not clear'? Don't you know what I mean?"

The author presents his three "natural laws of communication teaching: (1) Every communication teacher will this day hear this exact question. (2) You will hear this question for as long as you teach communication. (3) The day you retire you will still be trying to find the *completely* satisfactory answer."

The real boffs in the article are swiped from student papers (e.g., "Several conclusions can be drawn from this, but none of them are conclusive") but the author, who claims to be writing a tome titled *The Martyr-Persecution Syndrome in Teachers of Communication and How to Combat It,* lacks neither experience in teaching communication nor a sense of humor.

Unfortunately, this article gives little advice on how to cope with the problem it describes so well. It is, however, a delightful essay, and it is abstracted here in the hope that some reader may be motivated to compose a helpful paper on the subject.

Dale Arthur Level, Jr., "A Case Study of Human Communications in an Urban Bank," *Speech Monographs,* XXVII (June, 1960), 108–109.

This abstract of a Purdue University thesis describes a study which used an employee questionnaire, direct observation, and interviews with employees, supervisors, bank officers, customers, and noncustomers.

Despite the lack of a clear policy on communication, the internal communication was reasonably good except that the employees' knowledge of "bank practices and policies was only mediocre." The employees preferred oral and personalized media to written or impersonal forms of communication.

"Problems in internal communications were apparently most likely to occur in (*a*) stimulating the 'upward' flow of ideas, suggestions, and complaints, (*b*) handling reprimands and complaints, and (*c*) appraising job performance."

Employees who depended chiefly on the grapevine for information "seemed to suffer no ill effects so far as information, morale, and communication satisfaction were concerned."

Jack A. Holmes and Harry Singer, "The Substrata-Factor Theory: Substrata Factor Differences Underlying Reading Ability in Known Groups." (Report of research done under contract with the U.S. Office of Education.) Berkeley, Cal.: University of California, 1961. mimeo. 317pp.

Using two types of factor analysis, this study teased out the various factors underlying the reading abilities of a sample of 400 secondary school pupils. An analysis was then made of the elements basic to the primary factors associated with good and poor power and speed in reading. Analysis was

also made of boys versus girls and bright versus dull pupils. Skillfully designed diagrams are used to present results very clearly.

"In essence, the Substrata-Factor Theory holds that normally, reading is an audiovisual verbal processing skill of symbolic reasoning, sustained by the interfacilitation of an intricate hierarchy of substrata factors that have been mobilized as a psychological working-system and pressed into service in accordance with the purposes of the reader."

The major hypothesis of the study—that the various groups examined would "mobilize different substrata-factor hierarchies for the purpose of reading with speed and/or power"—was fully sustained by the data presented.

The independent variables employed were mental abilities, linguistic abilities, visual-verbal perception, listening comprehension, musical ability, academic attitudes, interest, emotional-social problems, and age.

—SAM DUKER

Robert J. Baldauf, "A Study of a Measure of Listening Comprehension and Its Relation to the School Achievement of Fifth Grade Pupils." Boulder Colo.: University of Colorado, 1960.

This study reports the results of a testing program carried on in the Cedar Rapids, Iowa, public schools. Two forms of the *STEP Listening Test*, Level 4, the *Otis Quick Scoring Intelligence Test*, Form Beta, and the *Stanford Achievement Test*, Form J, were administered to 352 fifth-grade pupils. The listening test was given twice with a one-week interval between administrations.

The correlation between scores on Form A of the *STEP test* given twice was .74; Form B, .88. Both these figures were well below the reliability claimed by the publisher. The scores of the group that took Form A first and Form B a week later yielded a correlation of .74.

The correlation between listening and intelligence was .58. This is in line with previous findings.

Whereas the correlation between listening and the several subtests on the *Stanford Achievement Test* was lower than that between the subtest scores and the *Otis*, the correlation was .82 both between the total score on the *Stanford* and listening and between the *Stanford* and intelligence.

Using partial correlation methods and holding mental ability constant, the partial correlation between listening and total score on the *Stanford* was .20.

—S. D.

William Charles Wilson, "Some Interrelationships of Verbal and Musical Listening Abilities in Elementary School Children," Ph.D. Dissertation, University of California, 1960.

This study reports the results of a testing program carried on in the Contra Costa County, California, public schools at the sixth grade level. There were 369 subjects. Tests used were the *STEP-Listening Test*, Form 4A, and three tests on musical listening ability: *Gaston's Test of Musicality*, Whistler and Thorpe's *Musical Aptitude Test*, and the *Kyme Test of Aesthetic Judgment*.

Correlations were low, varying from .40 to .10, but the group forming

(Continued on page 231.)

THE FORUM

Competition for space in *The Journal* has been so keen that a year has gone by since "The Forum" last appeared. Meanwhile friends of the NSSC have contributed a large number of important items of interest to our readers. Unfortunately, space permits only brief statements concerning most of these.

Numerous announcements of conferences and projects indicate that interest in communication is both widespread and lively. The following listing, based upon announcements which the Editor has received, probably includes only a small part of the total number of events of this type.

Languages-of-the-World Archives. George Washington University received a $47,700 contract from the U.S. Office of Education under Title VI of the National Defense Education Act for the purpose of carrying forward "an exhaustive compilation of authentic data on all of the world's languages and dialects known to exist." The number of languages, exclusive of dialects, is estimated at between 3,000 and 6,000. Dr. Siegfried H. Muller, on leave from Adelphi College, directed the project during the first semester, 1960–1961, and Dr. James C. King, of George Washington, was in charge during the spring semester, 1961.

Second International Congress on Information Processing. This meeting, which will be held in Munich, Germany, from August 27 to September 1, 1962, "will cover the mathematical and engineering aspects of communicating information between men and machines, encompassing techniques and equipment for the collection, transmission, translation, storage, retrieval, reduction, and display of information." Information may be obtained from E. L. Harder, Westinghouse Electric Corporation, East Pittsburgh, Pa. (This item and the three following are from *Scientific Information Notes,* III [June–July], 1961).

Transformational Analysis of Language Project. The University of Pennsylvania received a $180,400 National Science Foundation grant to investigate "how the transformational analysis of language can be applied to the mechanized storage and retrieval of scientific information." "Transformational analysis, which provides more information about the structure and meaning of sentences than does ordinary grammatical analysis, involves the decomposition of sentences into a number of elementary sentences, accompanied by operators indicating how these elementary components may be recombined to form a particular larger sentence." Zellig S. Harris, Department of Linguistics, University of Pennsylvania, is directing the project.

Institute for Advancement of Medical Communication. This organization has chosen a scientific council of twenty scientists and educators "to guide its program of research, development, and training aimed at improving communication among biomedical scientists and health science practitioners." The council represents "many of the disciplines and specialties contributing to and using the expanding pool of biomedical information." Information is available from Dr. Isaac D. Welt, Institute for Advancement of Medical Communication, 1028 Connecticut Avenue, NW, Washington 6, D.C.

Symposium on Information Services. The American Chemical Society's Division of Chemical Literature on September 3–8, 1961, conducted "a special symposium on various approaches to evaluating information services— their impact, utility, and sociological, psychological, and economic aspects." Viewpoints presented were those of research scientists, mathematicians, engineers, management, publishers, and sociologists and psychologists. Another paper dealt with national and international viewpoints.

Studies in Public Communication. This occasional journal (number 1, 1957; number 2, 1959; number 3, summer, 1961) is published at the University of Chicago under the editorship of Edward C. Uliassi (at Syracuse University, 1961–1962). According to its own statement of purpose, it "presents imaginative thought and research on the structure, functions, and effects of the media of public communication. It is broad in topical scope and interdisciplinary in nature, and includes (1) sociological and psychological studies of communication processes and effects, (2) studies of popular culture and the mass media, (3) studies of the political and economic context within which the media function, (4) explorations of new possibilities in communication research, and (5) assessments of the state of communication research."

Institute of Management. Johnson & Johnson through its Institute of Management provides courses in "Communication Skills," "Conference Leadership," and other areas in which communication is a significant element. The Institute has prepared an instructional manual, *Communications in Business and Industry*, for six two-hour sessions on "The General Problems of Communications in Business and Industry," "The Techniques of Meaningful Communications," "Conference on Communications Problems in *Your* Organization," "Communications and Preparing for Change," "Effective Listening," and "Communications Thru Effective Counseling."

Institute in Technical and Industrial Communications. The fourth annual Institute was held at Colorado State University, July 10–14, 1961, with Herman M. Weisman as director. "The intensive, week-long workshop and course" featured "group discussions, personal consultations, special problem clinics, films, and laboratory writing exercises" and carried "two quarter credits" from the University. Topics listed in the program included "Communications in an Age of Science," "Language and Semantic Problems in Scientific and Technical Writing," "Editing and Production of Scientific and Technical Journals," "Reporting Science," "Writing the Science and Engineering Textbook," "Specialized Speech Techniques," "Expository Techniques in Technical Writing," "Technical Writing in the Life Sciences," "Technical Public Relations," "Graphics," and "Communication Research."

Second Annual Conference on Communications in Science and Industry. The Department of Engineering and Engineering Extension, University of California, Los Angeles, with John B. Bennett of the System Development Corporation as general chairman, held this meeting on February 12–15, 1961. "We know the principles of successful writing, photography, and art," states the promotional leaflet; "we know how to teach these principles and the skills which implement them. But the man who must integrate them all ino a single effective communication system has no such guidance." Mr. Bennett described the Arrowhead method of conducting a conference in *The Journal of Communication*, X (Dec., 1960), 190–194.

Semantics Conferences. Both the Institute of General Semantics and the International Society for General Semantics held a number of seminars, workshops, and conferences during the year. Information concerning these

organizations is available respectively from Miss M. Kendig, Director, Institute of General Semantics, Lakeville, Conn., and Prof. S. I. Hayakawa, Secretary, International Society for General Semantics, San Francisco State College.

Business Writing Conferences. The American Business Writing Association, according to Francis W. Weeks, Secretary-Treasurer and Editor of *The ABWA Bulletin*, conducted regional conferences in the spring of 1961 at Dallas, Atlanta, New York City, and Chicago. The ABWA celebrated its silver anniversary at its annual convention in Washington, D.C., December 27–29, 1960. Its 1961 meeting will be at the Sheraton-Cleveland Hotel, Cleveland, December 27–29. Information concerning the ABWA may be secured from Professor Weeks, 101 David McKinley Hall, University of Illinois, Urbana.

IRE Conference on Technical-Scientific Communications. The theme of this meeting of the Institute of Radio Engineers, Inc., in Philadelphia, September 14–15, 1961, was "The Crisis in Technical-Scientific Communications, and What We Can Do about It." Promotional literature pointed out that "A great deal of needless duplication of research and development occurs from lack of information about concurrent, proposed, or contemplated projects," that "Gaps, omissions, or inadequacies—as a result of poor communications—arise in the research and development effort essential to private and public welfare," that "Hundreds of millions of dollars are wasted because the results of cancelled projects are not documented or disseminated," that "Costly delays occur for want of quick and accurate ways of searching and retrieving the vast information that does exist," that "Millions of dollars worth of information is permanently lost or temporarily withheld . . . from other workers because of inadequate documentation and dissemination," and that "thousands of priceless professional manhours go 'down the drain' because of too much 'noise' in the communication—obscure, wordy, pompous, fragmentary, disorganized, incorrect, misleading linguistics." The NSSC was represented on the program by its president, Dr. Thorrel B. Fest, and by a national council member, Dr. Bess Sondel.

The preceding items, though not inclusive, are sufficient to establish the Editor's point: the importance of communication is so widely recognized that professional groups as widely separated as doctors and radio engineers are concerning themselves both with theoretical concepts and practical applications. *The Journal of Communication* and the NSSC, thus, are at a focal point in the scientific, educational, and managerial problems of the mid-Twentieth Century. Our own annual summer conference at the University of Buffalo, August 27–29, which brought together leaders from business and industry and from numerous scholarly disciplines, also made the same point: that communication plays a vital role in the many separate fields which compose today's complex world is widely recognized.

Even Congress is aware of the importance of communication.

The *Congressional Record*, June 6, 1960, as an extension of the remarks of the Honorable Edwin B. Dooley, reprinted Mr. C. J. Dover's address, "Babel—A.D. 1960." "History abundantly confirms," Dover begins, "that progress in the art of human communication has been badly outdistanced by the rapid and spectacular scientific advances in communications technology."

Moreover, the House Committee on Un-American Activities, according to material supplied by Fran Cartier, a former editor of *The Journal*, investigated the semantics of communism. The dialogue for this part of the hearings of March 2, 1959, begins with Mr. Arens asking whether "there is a perversion by Communists and by communism of language as we of the free world conceive of it" and Dr. Stefan T. Possony replying, "There is no question about it."

* * * *

Changes in the book buying habits of college students are in an encouraging direction, according to Dr. Joseph Mersand's survey of the opinions of college bookstore officials. Among the data appearing in "On the Reading of Today's College Students," *The College Store Journal*, fall, 1960, pp. 147–157, are the following: "Are college students buying more or fewer books, other than their required textbooks, than their predecessors of ten, twenty or thirty years ago?" Yes, 83.9%; no, 3.7%. "Are they buying more of the quality non-fiction than before?" Yes, 81.1%; no, 8.49%. "On the basis of your experience, would you say that college students today have better taste in reading than before?" Yes, 56.6%; no, 16.98%. Dr. Mersand wrote that he planned to use this material in his book *Attitudes Toward English Teaching* (Philadelphia: Chilton Company, 1961).

* * * *

Educational television has both its detractors and admirers, and the Editor is happy to say that he, like Franklin Dunham, belongs in the latter group.

Litany for ETV

Messenger of Health
Quickener of the Spirit
Protector of Human Rights
Promoter of Free Discussion
Disseminator of the Arts

Exponent of Science
Protector of Children
Guide to the Good,
the True and the Beautiful
Refuge of the Aged
Spokesman for Youth
Opponent of the Closed Mind
Fighter Against Bigotry
Organizer of Healthful Sports
Leader in the Useful Means
of Leisure Time
Supporter of Good Government
Missionary for Good Books, Good
Pictures and Good Conversation
Defender of the Good Life

Lord, help me to accomplish my purpose,
for without Thy Divine Guidance, I perish.

—FRANKLIN DUNHAM

RESEARCH NOTES

(Continued from page 226.)

the upper quartile on the listening test was very definitely superior in the music tests to that comprising the lowest quartile. The author interprets this finding as suggesting: "That there is a relationship between skill in music listening and language listening, perhaps because of some common factor of a general nature which constitutes a skill of both."

The author also administered the *STEP* test to 54 sixth grade pupils who chose answers without hearing the paragraphs read. Everyone scored higher than chance. On three questions—46, 42, and 41—pupils respectively gave the right answers although the chance score was only 20.

—S. D.

Harry C. Triandis, "Categories of Thought of Managers, Clerks, and Workers about Jobs and People in an Industry," *Journal of Applied Psychology*, XLIII (October, 1959), 338–343.

Triandis attempts to categorize various groups of people (upper management, other management, female clerks, male clerks, and workers) by their jobs and their evaluation standards of acquaintance. Triads of jobs and people were presented to 105 subjects. They were asked, "Which one of these three jobs (people) is more different from the other two? Why?" Differences in the responses are noted, and an attempt is made to assess the significance of these differences for intergroup communication in industry.

This article is available as No. 83 in the reprint series published by the University of Illinois Institute of Labor and Industrial Relations.

—J. P. D.

BOOK REVIEWS AND NOTES

MARTIN P. ANDERSEN, *Editor*

CAUSALITY. By Mario Bunge. Cambridge: Harvard University Press, 1959; pp. xx + 380. $7.50.

Whether you think about it much or not, one of the most important determiners of the way you see the world around you (including the way you see communication processes) is your concept of the causes of things. Bunge's book will make you think about this principle.

The argument of the book may be reduced to a deceptively simple statement: that not every quantitative or qualitative change in nature or in human behavior can be said to be "caused" in the usual senses of that word, but that causation is but one of several ways by which events are determined. The development of this thesis is, however, anything but simple. The book is difficult. The style is mostly pedantic. The vocabulary is largely the technical jargon of logic and metaphysics (more especially epistemology and ontology). The arguments are often deep and intricate. But it probes so deeply into the reader's most fundamental thought processes that it somehow holds interest.

In large part, the book is an examination of the semantics of that family of words descendant from *cause* and *determine*. Such a limited semantic study could easily become tedious in the course of 380 pages. In fact, although Bunge does not entirely avoid tedium in his meticulous cataloguing of pro and con arguments, the book holds a kind of fascination as a test of intellectual endurance in the minute examination of our thought habits. It is never a simple matter to look closely and with uncompromising objectivity at such deeply ingrained ideas as those of cause and effect, but the effort is never unrewarding. The reader will come away from this book much better equipped than previously to defend his own theses, or else he will have new and previously undreamed of convictions. In either instance he will be much humbler.

Mind you, Bunge did not conceive his book as a study in semantics. Indeed, the trained semanticist will catch him in a few stumbles. These faults do not destroy the general argument one whit, however, for no one really expects the attempt to devise a single, generalized definition of *cause* to be successful. No one but a logician, that is, would have such an expectation. But Bunge plays his game masterfully; and though no reasonable necessity may exist for devising one definition to cover all possibilities of cause or determination, the author's search for such a general definition is a liberal education in one of the pivotal concepts of General Semantics and in one of the concepts the most fundamental to modern scientific thinking —the idea of *process*.

—FRANCIS A. CARTIER

Air University

THE PROCESS OF COMMUNICATION. By David K. Berlo. New York: Rinehart and Winston, Inc., 1960; pp. xiv + 318. $4.25.

The proclamation on the jacket that this book "provides for the first time a description of modern communication theory" will surprise such men as John Carroll and George Miller, to mention only two, but it is true that

this volume is the first to cover so much ground in terms which most of us can understand.

The book, although aimed at students beginning their study of communication—more particularly mass communication—will not find wide use in courses in communication skills since it does not deal directly with reading, writing, speaking, and listening. Because it is a general, introductory book it skips over or omits important areas in communication theory. It is inferior to John Carroll, *The Study of Language*, in its understanding of linguistics and psycholinguistics, is weaker than George Miller, *Language and Communication*, in many areas, is almost completely lacking in linguistics, and skimps such important approaches as Whorf, functionalism, and information theory. Its anthropology is weak; it does not really examine the philosophical implications of the theory it presents. In addition, it borrows heavily and paraphrases rather closely at times.

Having said all this, I still think the book is useful; Berlo, although trying to assimilate more than any of us can do well (even Miller is not sure-footed at times) has done a pretty good job. And, important, the author has avoided most of the jargon—he can be read. Until a better book comes along for the purpose, I recommend *The Process of Communication*: I just ordered copies for our reserve shelf for Effective Communication. My expectation is that students in basic skills courses, prospective teachers of English and speech, and those entering the various professions in the mass media will find this book of value.

—Herbert Hackett

State University of New York, Buffalo

Introduction to Mass Communications. By Edwin Emery, Phillip H. Ault, and Warren K. Agee. New York: Dodd, Mead & Company, 1960; pp. 435. $5.00.

With the recent phenomenal growth of the electronic media, especially television, the present-day educator concerned with mass communication is faced with the challenge of making sure that each student is aware of the elements common to all media within the field.

One of the chief complaints of many teachers of introductory courses in this area has been the lack of an adequate text. This book is the product of an effort to solve this problem. It shows how the mass communication process is essential to our social and economic fabric. It gives the historical perspective and present-day functions of mass media in a free society. Separate chapters are devoted to newspapers, magazines, radio and television, book publishing, the film, press associations and feature syndicates, advertising, public relations and information writing, and mass communications research. The final two chapters discuss education for professional careers and journalism teaching.

The overviews, despite their brevity and lack of supporting details or development, are rather complete. The book is loaded with statistics about the various media, but unfortunately, in the opinion of the reviewer, the authors chose not to include many of the references. Without some means of weighing the research findings summarized in the book, the reader may obtain a false impression of the exactitude of the figures given or feel that the data are all of equal reliability and validity—something which is not the case.

Perhaps it is unreasonable to expect a one-volume compression of ma-

terial about all the mass media to be both scholarly and readable. There is no doubt that those who have felt a need for an over-all view of communication will find this book a refreshingly unprovincial approach. As an overview of the entire field, it will also prove a valuable reference for almost any course related to mass communication.

—Reuben Mehling

Indiana University

The Open and Closed Mind. By Milton Rokeach. New York: Basic Books, Inc., 1960; pp. xvi + 447. $7.50.

Beginning with a theoretical description of belief systems, which emphasizes the structure rather than the content of an individual's organization of beliefs, the major part of this book reports a series of researches concerned either with the development of adequate measures of open and closed systems of belief or with the study of properties, correlates, and individual differences in belief systems. Two important new research instruments are presented, the Dogmatism and Opinionation Scales, with evidence in support of the reliability and the validity of these measures. Unfortunately, the relation of these scales to other important cognitive variables, such as intelligence, is not given; nevertheless, these contributions are likely to be valuable tools for research workers interested in problems of communication and thought. Shortcomings in the theory and supporting research are clearly discussed, and there are numerous suggestions for further investigations. This book is an important contribution to the study of thinking, and it has potentially valuable implications for communications research.

—Joel R. Davitz

Teachers College, Columbia University

Anatomy and Physiology of Speech. By Harold M. Kaplan. New York: McGraw-Hill Book Company, Inc., 1960; pp. x + 365. $8.50.

The author teaches a course in the Anatomy and Physiology of Speech at Southern Illinois University. The information, which is presented from the standpoint of a physiologist, "attempts to unify the presently known and prominent anatomical and physiological data into an orderly account of the normal sensory and motor aspects of speech." The first part of the book describes the neural and endocrine regulators of speech, and the second deals with the various structures which are related to speech.

This is no "easy text." The subject is treated with an academic soundness which is a credit to the author and to our profession. The material is detailed for a first course, but the serious student will be rewarded for the time and the effort which he spends in "digesting" this volume.

—Norman Wm. Freestone

Occidental College, Los Angeles

Man and Organization. By William Foote Whyte. Homewood, Ill.: Richard D. Irwin, Inc., 1959; pp. viii + 103. $4.50.

Whyte's provocative thesis deals with three areas of general interest to a study of the communication process. (1) In the philosophical problem of free will vs. determinism Whyte submits that ordinary skill, training, or

manipulative techniques cannot bring about major improvements in human relations and that only changes in the total environmental forces and in the pattern of interaction among men can lead to improvement. (One wonders whether Whyte has reviewed the results of Dr. Irving Lee's oral communication training in business.) (2) On the conceptual problem of a useful theoretical system of analyzing human behavior, Whyte persuasively makes a case for his brand of interaction theory; he debunks exclusive reliance on questionnaires because they emphasize attitudes to the neglect of patterns of interpersonal relations. (3) On the practical problem of relating research to action, Whyte says we should use research findings as part of the process of administration.

—C. J. Dover

General Electric Company, New York

Practical Speech Fundamentals. By Eugene E. White. New York: The Macmillan Company, 1960; pp. x + 519. $5.75.

This text "is designed primarily for use in beginning speech courses employing the fundamentals' approach," states its author. It admirably serves its purpose by covering in a clear and informal style the various elements of the oral communication process: the speaker, the audience, and the ideas communicated through public speaking, discussion, or oral reading. In addition, new light is shed on some old theories in a discussion of a positive approach to speaking, in a concise and clear treatment of the octophased process of communication, and in the frequent references to recent experimental studies in the field of public address. What may seem verboseness to some, will seem to others a wealth of usable material.

—Jack B. Cullen

Los Angeles State College

Improving Your Voice. By John Grasham and Glenn Gooder. New York: Harcourt, Brace and Company, 1960; pp. xx + 326. $3.75. (Paper.)

Texts on voice and speech improvement in the past few years have had the frequency and sameness of tracer shells with none of the impact. Most repeat the old anatomical verities and fill up the rest with exercises supposedly stressing a particular speech sound or inflection. From a corrective standpoint these drills differ little from a random passage in the *Congressional Record*.

Teachers of Voice and Diction (under the various aliases) may welcome *Improving Your Voice* as a fresh and virile departure from the usual and may be willing to overlook a few contrived practice sentences because of the meaty sections on anatomy, vocal control, phonetics, and diacritics—to name a few. One unique feature is a short section on Creative Expression (showmanship).

The attractive, compact volume has two more things to recommend it: a teachable format and a lean, clean style. It is illustrated.

—Robert Gillen

Los Angeles State College

Speech for Everyday Use. (Revised Edition.) By Elizabeth G. Andersch and Lorin C. Staats. New York: Rinehart & Company, Inc., 1960; pp. xvi + 329. $4.75.

A large number of revised editions of speech texts have come off the press in the last few years. This revision is the most thoroughgoing one

which I have seen. The authors have almost written a new text. It is a good one, although it does have some weaknesses.

The book has two parts—one on theory and one on practice. The opening chapter by Claude E. Kantner on "The Nature, Function, and Problems of Language" provides a good frame of reference for the remainder of the work—specifically, it establishes the book's "contemporary oral communication" base. The second chapter, "An Analysis of Oral Communication," presents speech as a speaking–listening cycle in which the role of the listener and the situation in which the communicative act takes place are important. The third chapter considers the speaker's purpose, his individuality, and his responsibility. Next are six chapters dealing with organization, voice, listening, and specific suggestions for improving effectiveness in platform and in group speaking. There is also a brief chapter on parliamentary procedure.

Part One contains no exercises. Part Two consists of drills and projects for home work and of individual and group performance activities for class presentation.

The book is clearly and simply written. The illustrations seem adequate and appropriate. Rib-tickling and thought-provoking cartoons are found throughout the book.

Several points, however, may be criticized. Many teachers may find the inclusion of all exercises in the last one third of the book a drawback. Also, many may find the arrangement of content and the choice of headings within the chapters confusing. The pedagogical principles on which the over-all pattern of the book is based are hard to understand. There is a tendency toward oversimplification.

Those who used the 1950 edition of the book, however, will like this one even better. Others also will find it a usable text.

—MPA

GUIDE TO GOOD SPEECH. (Second Edition.) By James H. McBurney and Ernest J. Wrage. Englewood Cliffs, N.J.: Prentice–Hall, Inc., 1960; pp. x + 342. $4.95.

The users of the 1955 edition of *Guide to Good Speech* will find this revision even more to their liking. The arrangement of content within the chapters, the meaningful illustrations and exercises, and the improved over-all format have increased the book's teachability. The theoretical content and the practical suggestions for speech improvement are sound. The volume is both practical and readable.

Although the revision is not as "complete" as is claimed, the new version will certainly be welcomed.

The cartoons by Burr Shafer are a delight! The photographs appearing at the beginning of each chapter are new, directly related to the content of the chapter, thought provoking, and helpful. They provide positive suggestion, which helps nudge the student in the direction of desirable speech practices.

—MPA

THE PSYCHOLOGICAL REPORT. By Walter G. Klopfer. New York: Grune and Stratton, 1960; pp. x + 146. $4.50.

The writing of clinical reports requires rather specific techniques of communication. Ideally, they are concise, descriptive, and objective. Dr.

Klopfer in this volume describes the writing of such reports for the referring agency, the client, and the clinician.

The problems of communicating clinical information clearly are discussed in chapters dealing with the language of the report, the relationship of the report to other information, and barriers to communication.

Supervisors of in-training clinical facilities will particularly welcome the assistance of this book in teaching students adequate and accurate communication in report writing.

—J. L. STEWART

University of Denver

AMERICAN FORUM: SPEECHES ON HISTORIC ISSUES, 1788–1900. By Ernest J. Wrage and Barnet Baskerville. (Editors.) New York: Harper & Brothers, 1960; pp. x + 377. $5.50.

The collection presents opposing speakers expressing their respective viewpoints "to provide the substance and framework of an American forum as a venture in intellectual history through public address." It succeeds in providing a rich historical heritage "in the context of its time" for speech students. The introductions to these historic issues are superbly written.

The book is deficient in that it fails to give speech students the rhetorical standards for adequate judgment of the speeches. The biographical material is satisfactory, but interpretations of the rhetorical qualities generally are insufficient. Historical evaluation ought to be combined with cogent philosophical insight.

—GEORGE W. DELL

University of California, Los Angeles

SMALL-GROUP DISCUSSION IN ORIENTATION AND TEACHING. By Randall W. Hoffmann and Robert Plutchik. New York: G. P. Putnam's Sons, 1959; pp. xvi + 168. $4.00.

The authors state that this book is designed primarily for faculty and administrators who have responsibilities for freshman orientation courses. They also express the hope that it will be of value to anyone who is "interested in small-group discussion as an educational method."

During an eight-year period the authors have been developing a freshman orientation course at a liberal arts college. On the basis of their experiences and study they conclude that the "purposes of orientation are best realized through a small group approach, with teachers employing a group-centered method of leadership."

The book first describes orientation practices, trends, and aims. It then gives practical suggestions, albeit elementary in nature, to help the reader develop group climate, procedures, structure, and content which will contribute to the basic aim of orientation, namely, the modification of attitudes "in such a way as to help the student become more receptive to what college offers." The authors recommend a training program for orientation faculty and individual counseling to supplement small-group discussion.

The book is not an "advanced" text. However, it is clearly and simply written; it treats the minimum essentials of small-group discussion; and it should serve its prospective readers well. It rightly argues that a reduction in barriers to communication will be one result of small-group discussion in orientation and teaching.

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NEW JOURNAL OFFICIALS

On January 1, 1962, the following officials will become responsible for *The Journal of Communication*:

Editor: Frank E. X. Dance
Department of Speech
University of Kansas
Lawrence, Kansas

Business Manager: Roger Lee Baumeister
Division of Humanities
University of Illinois, Navy Pier
Chicago 11, Illinois

Correspondence concerning manuscripts should be directed to Dr. Dance; inquiries regarding subscriptions, library orders, and the purchase of single issues should be sent to Mr. Baumeister.

GROUP DYNAMICS

(Continued from page 223.)

class. What weight to give student opinion, is, of course, a difficult matter to decide. The writer's belief is that literacy is more likely to be a continuous value with most of the students in Section A than is generally the aftereffect of freshman English.

In conclusion, no teacher can force interaction against student unwillingness. Therefore, the most that one can claim for the techniques described in this article is that they are helpful and that once interaction takes place the students may have experiences which will facilitate learning.

EDITORIAL

(Continued from Inside Front Cover page.)

NSSC members will help secure new subscribers, the size can be expanded still further); (2) the policy of securing guest editorials was instituted; (3) the Book Review Department was expanded, Research Notes was revitalized, and the Forum and the Communication Films Department were instituted; (4) the field from which our contributors come was enlarged both geographically and in respect to the number of academic disciplines; (5) through the efforts of Fran Cartier an Index to Volumes I–X was published as a separately bound supplement to the March, 1961, issue; (6) symposia on (*a*) Nonverbal Communication, (*b*) Communication Analysis, and (*c*) Foundations of Communication Theory brought together collections of articles forming a fairly comprehensive view of the topics named; and (7) the Decennial Project, with articles appearing in a series of six issues, produced a multiphased look at the status of communication in 1960, at the accomplishments of the preceding decade, and at the prospects just ahead. Manuscripts in the Decennial Project, never before listed together, were these:

A Glance Backward ..... Thomas R. Lewis
A Rationale for a Definition of Communication ... John B. Newman
Some Characteristics of the Study of Communication in 1960 ..... Theodore Clevenger, Jr.